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OF THE

National Dental Association

INCLUDING THE

EIGHTH ANNUAL MEETING

St. Louis, Mo., September 2, 1904

AND THE

NINTH ANNUAL MEETING

Buffalo, N. Y., July 25-28, 1905

PHILADELPHIA
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ST. LOUIS, MO., SEPTEMBER 2, 1904.

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Presiding Officers of the Former Associations.

Presiding Officers of the American Dental Association and of the Southern Dental Association prior to Consolidation.

Ex-Presidents of the American Dental Association.

1859. W. W. ALLPORT, Chicago, Ill.
First meeting, for organization.
1860. W. H. ATKINSON, Cleveland, Ohio.
1861. (No meeting.)
1862. GEORGE WATT, Xenia, Ohio.
1863. W. H. ALLEN, New York, N. Y.
1864. J. H. MCQUILLEN, Philadelphia, Pa.
1865. C. W. SPALDING, St. Louis, Mo.
1866. C. P. FITCH, New York, N. Y.
1867. A. LAWRENCE, Lowell, Mass.
1868. JONATHAN TAFT, Cincinnati, Ohio.
1869. HOMER JUDD, St. Louis, Mo.
Owing to a change in the constitution, officers elected at this and the sessions following served at the next annual meeting subsequent to their election.
1870. W. H. MORGAN, Nashville, Tenn.
1871. GEO. H. CUSHING, Chicago, Ill.
1872. P. G. C. HUNT, Indianapolis, Ind.
1873. T. L. BUCKINGHAM, Philadelphia, Pa.
1874. M. S. DEAN, Chicago, Ill.
1875. A. L. NORTHROP, New York, N. Y.
1876. GEO. W. KEELY, Oxford, Ohio.
1877. F. H. REHWINKEL, Chillicothe, Ohio.
1878. H. J. MCKELLOPS, St. Louis, Mo.
1879. L. D. SHEPARD, Boston, Mass.
1880. C. N. PEIRCE, Philadelphia, Pa.
1881. H. A. SMITH, Cincinnati, Ohio.
1882. W. H. GODDARD, Louisville, Ky.
1883. E. T. DARBY, Philadelphia, Pa.
1884. J. N. CROUSE, Chicago, Ill.
1885. W. C. BARRETT, Buffalo, N. Y.
1886. W. W. ALLPORT, Chicago, Ill.
1887. FRANK ABBOTT, New York, N. Y.
1888. C. R. BUTLER, Cleveland, Ohio.
1889. M. W. FOSTER, Baltimore, Md.
1890. A. W. HARLAN, Chicago, Ill.
1891. W. W. WALKER, New York, N. Y.
1892. J. D. PATTERSON, Kansas City, Mo.
1893. (Formal session only, owing to the holding of the World's Columbian Dental Congress; officers elected in 1892 held over until 1894.)
1894. J. Y. CRAWFORD, Nashville, Tenn.
1895. J. Y. CRAWFORD, Nashville, Tenn.
1896. JAMES TRUMAN, Philadelphia, Pa.

Ex-Presidents of the Southern Dental Association.

1869. W. T. ARRINGTON, Memphis, Tenn.
First meeting, for organization; Jas. S. Knapp, chairman *pro tem.*
1870. W. T. ARRINGTON, Memphis, Tenn.
1871. JAS. S. KNAPP, New Orleans, La.
1872. F. Y. CLARK, Savannah, Ga.
1873. H. M. GRANT, Abingdon, Va.
1874. ROBERT ARTHUR, Baltimore, Md.
1875. J. R. WALKER, New Orleans, La.
1876. W. T. ARRINGTON, Memphis, Tenn.
1877. W. G. REDMOND, Louisville, Ky.
1878. S. J. COBB, Nashville, Tenn.
1879. F. J. S. GORGAS, Baltimore, Md.
1880. J. B. PATRICK, Charleston, S. C.
1881. V. E. TURNER, Raleigh, N. C.
1882. E. S. CHISHOLM, Atlanta, Ga.
1883. L. D. CARPENTER, Atlanta, Ga.
1884. H. J. MCKELLOPS, St. Louis, Mo.
1885. A. O. RAWLS, Lexington, Ky.
1886. W. C. WARDLAW, Augusta, Ga.
1887. W. W. H. THACKSTON, Farmville, Va.
1888. B. H. CATCHING, Atlanta, Ga.
1889. J. Y. CRAWFORD, Nashville, Tenn.
1890. JOHN C. STOREY, Dallas, Tex.
1891. G. F. S. WRIGHT, Georgetown, S. C.
1892. GORDON WHITE, Nashville, Tenn.
1893. B. HOLLY SMITH, Baltimore, Md.
1894. (Same officers held over.)
1895. H. E. BEACH, Clarksville, Tenn.
1896. JOHN S. THOMPSON, Atlanta, Ga.
1897. W. H. RICHARDS, Knoxville, Tenn.

Organization of the N. D. A.

OFFICERS.

President—M. F. FINLEY, 1928 "I" St., N. W., Washington, D. C.
Vice-president—East, L. P. BETHEL, 1255 Neil Ave., Columbus, O.
" " —*South,* FRANK HOLLAND, 717 Prudential Bldg., Atlanta, Ga.
" " —*West,* WM. CONRAD, 3666 Olive St., St. Louis, Mo.
Corresponding Secretary—C. S. BUTLER, 267 Elmwood Ave., Buffalo, N. Y.
Recording Secretary—A. H. PECK, 92 State St., Chicago, Ill.
Treasurer—V. E. TURNER, 107½ Fayetteville St., Raleigh, N. C.

EXECUTIVE COUNCIL.

Chairman—H. J. BURKHART, Batavia, N. Y.

J. W. CRAWFORD, Jackson Building, Nashville, Tenn.
CHAS. MCMANUS, 80 Pratt St., Hartford, Conn.
F. D. HETRICK, Ottawa, Kan.
E. K. BLAIR, Waverly, Ill.

EXECUTIVE COMMITTEE.

Chairman—J. D. PATTERSON, Keith & Perry Building, Kansas City, Mo.

FIRST DIVISION—Committee on Arrangements.

J. D. PATTERSON [*1908], Keith & Perry Building, Kansas City, Mo.
C. N. JOHNSON [*1906], Marshall Field Building, Chicago, Ill.
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*Term expires.

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*Term expires.

ORGANIZATION OF SECTIONS.

SECTION I: Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

B. L. THORPE, *Chairman*, 305 North Grand Ave., St. Louis, Mo.
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WM. CARR, 35 W. Forty-sixth St., New York, N. Y.
BURTON LEE THORPE, 305 North Grand Ave., St. Louis, Mo.

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PARR, H. A., 38 W. 34th st., New York, N. Y.
PARSONS, STARR, 439 9th st., N. W., Washington, D. C.
PATTERSON, J. D., Keith and Perry Bldg., Kansas City, Mo.
PECK, A. H., 92 State st., Chicago, Ill.
PEIRCE, C. N., 3316 Powelton ave., Philadelphia, Pa.

PENDERGRASS, A. L., Helena, Ark.
PENDLETON, R. H., Norman, Okla.
PERKINS, CHAS. E., 147 Main st., Brockton, Mass.
PERRY, GEO. B., 100 State st., Chicago, Ill.
*PERRY, S. G., 46 W. 37th st., New York, N. Y.
PFEIFER, JOSEPHINE D., 1303 Masonic Temple, Chicago, Ill.
POTTER, W. H., 16 Arlington st., Boston, Mass.
*POWELL, C. B., Jacksonville, Ill.
POVALL, W. H., Mount Morris, N. Y.
PRICE, G. H., Helena, Ark.
PROCTOR, W. E., Sheffield, Ala.
PROSEUS, F. W., 238 Monroe ave., Rochester, N. Y.
PROSSER, A. J., 3901 Westminster Pl., St. Louis, Mo.
PRUYN, C. P., 92 State st., Chicago, Ill.
PULLEN, H. A., Mooney-Brisbane Bldg., Buffalo, N. Y.
QUATTLEBAUM, E. G., 1516 Main st., Columbia, S. C.
RAMBO, L. H., Montgomery, Ala.
RAMSEY, W. B., Hickory, N. C.
RAYMOND, H. C., 1134 Majestic Bldg., Detroit, Mich.
REED, J. G., Marion, N. C.
REEVES, W. T., 100 State st., Chicago, Ill.
REITZ, R. B., 38 E. 61st st., New York, N. Y.
*REMINGTON, F. A., 57 W. 59th st., New York, N. Y.
REYNOLDS, W. R., Salem, Va.,
*RHEIN, MEYER L., 38 E. 61st st., New York, N. Y.
RICH, CELIA, Jackson Bldg., Nashville, Tenn.
RICH, S. L., Jackson Bldg., Nashville, Tenn.
RICHARDS, W. H., 417 W. Clinch ave., Knoxville, Tenn.
RICHARDSON, CHAS., Fayetteville, Ark.
RICHTER, R. G., 128 Wisconsin st., Milwaukee, Wis.
*ROBERTS, H. E., 1516 Locust st., Philadelphia, Pa.
*ROBERTS, NORMAN J., Waukegan, Wis.
RODGERS, C. W., 165 Harvard st., Dorchester, Mass.
ROE, W. J., 320 S. 11th st., Philadelphia, Pa.
ROHLAND, C. B., 123 3d st., Alton, Ill.
ROOT, J. P., Deardorf Bldg., Kansas City, Kans.
ROSE, E. D., Bowling Green, Ky.
RULE, R. W., Pella, Iowa.
RUNYAN, A. C., 110 Lake ave., South Haven, Mich.
RUTLEDGE, B., Lock Box 45, Florence, S. C.
SANGER, R. M., 34 Harrison st., East Orange, N. J.
SARRAZIN, J. J., Godchaux Bldg., New Orleans, La.
SAVAGE, GEO. E., 14 Knowles Block, Worcester, Mass.
SAWYER, C. B., Jacksonville, Ill.
*SCHAMBERG, MORRIS I., 1636 Walnut st., Philadelphia, Pa.
*SCHMIDT, JOHN A., 1195 Deane st., Brooklyn, N. Y.
*SEARLES, C. S., 100 State st., Chicago, Ill.
SEIP, HOWARD S., Allentown, Pa.
SHARP, S. P., Deaderick Bldg., Knoxville, Tenn.
*SHEPARD, L. D., 330 Dartmouth st., Boston, Mass.
SHIELDS, NELSON T., 61 W 56th st., New York, N. Y.
SHOREY, E. A., Dover, N. H.
SHREYOCK, WM. W., 27 W. Berry st., Fort Wayne, Ind.
SIBLEY, A. H., 1214 Filbert st., Philadelphia, Pa.
SIMONS, B. M., Charleston, S. C.
SIMS, WM. P., Jackson Bldg., Nashville, Tenn.
SITHERWOOD, G. D., 118 W. Washington st., Bloomington, Ill.
SLACK, W. M., Memphis Trust Bldg., Memphis, Tenn.
SLATER, W. K., Empire Bldg., Knoxville, Tenn.
SLAUGHTER, N. G., Athens, Ga.
SMITH, B. Holly, 1007 Madison ave., Baltimore, Md.
*SMITH, D. D., 1629 Walnut st., Philadelphia, Pa.
SMITH, EUGENE H., 283 Dartmouth st., Boston, Mass.
SMITH, F. M., 38 W. 36th st., New York, N. Y.
*SMITH, G. MARSHALL, 1009 Madison ave., Baltimore, Md.
SMITH, H. A., 116 Garfield Pl., Cincinnati, O.
SMITH, H. T., 116 Garfield Pl., Cincinnati, O.
SMITH, J. P., Martinsville, Va.
SMITH, L. A., Box 42, Port Gibson, Miss.
SMITH, M. C., 3 Lee Hall, Lynn, Mass.
SMITH, W. R., Pawnee City, Neb.
SMITH, W. W., 63 East ave., Rochester, N. Y.
SONNTAG, A. F., Waco, Tex.

SOUTHWELL, C. C., 408 Goldsmith Bldg., Milwaukee, Wis.
SPENCE, S. J., 240 Montgomery ave., Chattanooga, Tenn.
SPURGEON, J. S., Hillsboro, N. C.
STAINTON, C. W., 47 North Pearl st., Buffalo, N. Y.
STANLEY, NED A., 3 Pleasant st., New Bedford, Mass.
*STARR, A. R., 8 E. 92d st., New York, N. Y.
STELLWAGEN, THOS. C., 1328 Chestnut st., Philadelphia, Pa.
STEPHEN, JOHN F., 29 Euclid ave., Cleveland, O.
*STERN, DAVID, 108 Garfield Place, Cincinnati, O.
*STEVENS, B. Q., Cor. Main and Broadway, Hannibal, Mo.
STEWART, ELBERT, Little Rock, Ark.
STEWART, H. T., Scimiter Bldg., Memphis, Tenn.
STIFF, F. W., 600 E. Grace st., Richmond, Va.
STING, E. H., Tiffin, O.
*STOCKTON, C. S., 22 Central ave., Newark, N. J.
STRAIGHT, M. B., 80 W. Huron st., Buffalo, N. Y.
STRANG, CLINTON W., 1051 Main st., Bridgeport, Conn.
STUART, J. T., 128 Wisconsin st., Milwaukee, Wis.
STUBBLEFIELD, D. R., Willcox Bldg., Nashville, Tenn.
SUTPHEN, H. S., 24 E. Kinney st., Newark, N. J.
SWING, R. H. D., 703 N. 40th st., Philadelphia, Pa.
TAGGART, C. C., 409 Lewis Bldg., Pittsburg, Pa.
TALBOT, W. O., Biloxi, Miss.
TALBOTT, ROBT. W., 1323 "G" st., N. W., Washington, D. C.
TAVEL, C. A., Lyceum Bldg., Memphis, Tenn.
TAYLOR, L. C., 68 Pratt st., Hartford, Conn.
TAYLOR, WALTER J., 706½ K st., Sacramento, Cal.
*TEAGUE, B. H., Aiken, S. C.
THOMAS, J. D., 1122 Walnut st., Philadelphia, Pa.
THOMPSON, A. H., 720 Kansas ave., Topeka, Kans.
THOMPSON, C. N., 3017 Michigan ave., Chicago, Ill.
*THOMPSON, HENRY C., 1113 Pennsylvania ave., Washington, D. C.
THOMPSON, R. W., Spartanburg, S. C.
THORPE, BURTON LEE, 305 N. Grand ave., St. Louis, Mo.
*TILESTON, H. B., 314 Equitable Bldg., Louisville, Ky.
TOPLIFF, C. L., Decorah, Iowa.
TOWNSEND, A. F., 11 Pleasant st., Worcester, Mass.
TRACY, M. C., 46 W. 51st st., New York, N. Y.
*TRACY, W. D., 46 W 51st st., New York, N. Y.
TRUMAN, JAMES, 4505 Chester ave., Philadelphia, Pa.
TRUEMAN, WM. H., 900 Spruce st., Philadelphia, Pa.
TUCKER, E. J., Roxboro, N. C.
TUNSTALL, P. R., JR., 97 Dauphin st., Mobile, Ala.
TURNER, C. R., Univ. Pa. Dormitories, Philadelphia, Pa.
TURNER, M. E., 719 Prudential Bldg., Atlanta, Ga.
TURNER, V. E., 107½ Fayetteville st., Raleigh, N. C.
VAN BUSKIRK, W. L., 109 Wyoming ave., Scranton, Pa.
*VAN STRATUM, F. G., Hurley, Wis.
*VAN VLECK, CHAS. K., 536 Warren st., Hudson, N. Y.
VANN, GEO. S., Gadsden, Ala.
VANN, N. N., Attalla, Ala.
VOEGTLEN, J. S., 113 Howard st., Newark, N. J.
WALKER, J. LEWIS, 29 Granby st., Norfolk, Va.
WALKER, R. H., 231 Main st., Norfolk, Va.
WALKER, W. ERNEST, 405 Macheca Bldg., New Orleans, La.
WALKER, W. W., 58 W. 50th st., New York, N. Y.
WALTON, J. ROWLAND, 700 10th st., N. W., Washington, D. C.
WARE, R. E., Shelby, N. C.
*WARNER, E. R., 401 California Bldg., Denver, Colo.
WASSALL, J. W., 711 Stewart Bldg., Chicago, Ill.
WATERS, T. S., 756 N. Eutaw st., Baltimore, Md.
WATKINS, J. C., Winston, N. C.
WATKINS, S. C. G., Mont Clair, N. J.

*WEBER, A. G., Corrales 1, Havana, Cuba.
WEDELSTAEDT, E. K., 204 N. Y. Life Bldg., St. Paul, Minn.
*WELCH, GEO. B., 1344 "G" st. N. W., Washington, D. C.
WELLS, W. D., Commercial B'k Bldg., Macon, Ga.
WENDELL, W. C., 708 Goldsmith Bldg., Milwaukee, Wis.
WEST, GEO. N., 100 State st., Chicago, Ill.
WESTERFIELD, T. L., 232 Main st., Dallas, Tex.
WESTMORELAND, W. W., Columbus, Miss.
WHEELER, HERBERT L., 12 W. 46th st., New York, N. Y.
WHITBY, T. P., Vaughan Bldg., Selma, Ala.
WHITE, C. L., Bassett Bldg., Oklahoma City, Okla.
*WHITE, GORDON, 610½ Church st., Nashville, Tenn.
WHITE, W. A., Phelps, N. Y.
WHITFIELD, GEO. M., 216 S. 6th st., Newark, N. J.
WHITMAN, C. B., Orlando, Fla.
WHITMAN, F. S., Auburn, Ala.
WHITNEY, A. L., 607 McPhee Bldg., Denver, Colo.
WHITSETT, W. G., Lebanon, Tenn.
WHITSLAR, W. H., 700 Schofield st., Cleveland, O.
WIBER, D. E., 1329 "F" st. N. W., Washington, D. C.
*WILLIAMS, JACOB L., 4 Walnut st., Boston, Mass.
WILSON, F. C., 114½ Jones st., Savannah, Ga.
WILSON, GEO. H., 44 Euclid ave., Cleveland, O.
WISE, J. D., West Point, Miss.
WOLFE, L. S., 1114 "F" st., N. W., Washington, D. C.
WOMACK, C. T., Martinsville, Va.
WOOD, F. L., Roanoke, Va.
WOODBURY, FRANK, 137 Hollis st., Halifax, Nova Scotia.
WORK, C. M., Ottumwa, Iowa.
WRIGHT, J. C., Tupelo, Miss.
WRIGHT, W. R., Jackson, Miss.
WYATT, THOMAS M., Bentonville, Ark.
YERKES, H. R., Bucks Bldg., Doylestown, Pa.
YOUNG, H. Newton, 215 S. Franklin st., Wilkesbarre, Pa.
YOUNG, J. L., 63 W., 49th st., New York, N. Y.
YOUNG, L. M., 4661 Maryland ave., St. Louis, Mo.
ZIRKLE, W. M., English Amer. Bldg., Atlanta, Ga.

NEW MEMBERS—Received in 1904.

BRIGGS, E. C., 129 Marlboro st., Boston, Mass.
BRYANT, E. A., 1320 New York ave., Washington, D. C.
CUMMINGS, W. A., Marquam, Bldg., Portland, Ore.
CUTHBERTSON, C. W., 309 7th st. N. W., Washington, D. C.
PARSONS, STARR, 439 9th st. N. W., Washington, D. C.
WEBER, A. G., Corrales 1, Havana, Cuba.

Received in 1905.

ARTHUR, H. W., 952 Penn ave., Pittsburg, Pa.
BEACH, J. W., 52 N. Pearl st., Buffalo, N. Y.
BEATTY, C. H., Bond Bldg., Washington, D. C.
BEECROFT, W. G., Madison, Wis.
BOYNTON, G. W., 817 14th st. N. W., Washington, D. C.
BRUSH, F. C., 1183 Broadway, New York, N. Y.
BYRAM, J. Q., 131 E. Ohio st., Indianapolis, Ind.
CHILCOTT, L. S., Bangor, Me.
CIGRAND, B. J., cor. North and Robey sts., Chicago, Ill
CONZETT, J. V., Dubuque, Iowa.
COREY, F. G., Council Grove, Kans.
DAMERON, E. P., 58 DeMenil Bldg., St. Louis, Mo.
DANFORTH, J. S., Sheboygan, Wis.
DEANE, W. C., 616 Madison ave., New York, N. Y.
DONNEGAN, E. J., 110 N. Washington ave., Scranton, Pa.

DUNNING, W. B., 50 W. 45th st., New York, N. Y.
ESHLEMAN, G. W., 726 W. Cedar st., Cherokee, Iowa.
FREDERICH, V. H., Grand ave. and Shenandoah st., St. Louis, Mo.
FRIESELL, H. E., 6000 Penn ave., Pittsburg. Pa.
FOSSUME, F. L., 616 Madison ave., New York, N. Y.
GREENE, F. A., Geneva, N. Y.
GRISWOLD, E. R., Dansville, N. Y.
GOODE, GLADSTONE, 29 W. 37th st., New York, N. Y.
GUILFORD, D., 1631 Walnut st., Philadelphia, Pa.
HETRICK, F. O., Ottawa, Kans.
HULL, J. W., Altman Bldg., Kansas City, Mo.
HUNTER, J. A., 744 9th st., Washington, D. C.
JONES, P. H., Clear Lake, Iowa.
KELSEY, H. E., Commonwealth B'k Bldg., Baltimore, Md.
KNOWLTON, F. W., Akron, O.
KOCH, C. R. E., Northwestern Univ., Chicago, Ill.
LEWIS, O. G. L., 5601 Green st., Philadelphia, Pa.
LINDSTROM, C. R., 31 Exchange st., Lynn, Mass.
LINK, E. G., Cutler Bldg., Rochester, N. Y.
LISCHER, B. E., Humboldt Bldg., St. Louis, Mo.
LORENZ, J. H., Inman Bldg., Atlanta, Ga.
LOW, F. W., 52 N. Pearl st., Buffalo, N. Y.
MEISBURGER, LOUIS, 85 N. Pearl st., Buffalo, N. Y.
MITCHELL, G. B., 448 Porter ave., Buffalo, N. Y.
MOORE, G. T., Mt. Morris, N. Y.
NYCE, J. E., 2320 S. Broad st., Philadelphia, Pa.
POVALL, W. H., Mt. Morris, N. Y.
PULLEN, H. A., Mooney-Brisbane Bldg., Buffalo, N. Y.
RAMBO, L. H., Montgomery, Ala.
SHOREY, E. A., Dover, N. H.
SLAUGHTER, N. G., Athens, Ga.
SMITH, F. M., 38 W. 36th st., New York, N. Y.
SOUTHWELL, C. C., 409 Goldsmith Bldg., Milwaukee, Wis.
STANLEY, N. A., 3 Pleasant st., New Bedford, Mass.
STING, E. H., Tiffin, O.
TRACY, M. C., 46 W. 51st st., New York, N. Y.
TRUEMAN, W. H., 900 Spruce st., Philadelphia, Pa.
VAN BUSKIRK, W. L., 109 Wyoming ave., Scranton, Pa.
WHITE, C. L., Bassett Bldg., Oklahoma City, Okla.
WORK, C. M., Ottumwa, Iowa.
YOUNG, J. L., 63 W. 49 st., New York, N. Y.

PERMANENT MEMBERS WITHOUT DUES.

The following members are "permanent without payment of dues," under Standing Resolution No. 10, by virtue of having been in reputable practice for a period of fifty years:

FIELD, GEO. L., 4 Adams ave., W., Detroit, Mich.
FUNDENBERG, W. F., Lewis Bldg., Pittsburg, Pa.
HEWITT, A. C., 2104 Kenmore ave, Chicago, Ill.
HOLMES, E. S., 8 New Aldrich Bldg., Grand Rapids, Mich.
LYMAN, A. E., Melbourne, Fla.
MARSHALL, E. B., Rome, Ga.
MOORE, J. HALL, Richmond, Va.
PALMER, CORYDON, Warren, Ohio.
PEIRCE, C. N., Philadelphia, Pa.

Surviving Charter Members of the Southern Dental Association.

The following surviving charter members of the Southern Dental Association are "permanent members without dues":

ARRINGTON, B. F., Goldsboro, N. C.
AUGSPATH, LOUIS, Little Rock, Ark.
BOYD, H. D., Troy, Ala.
BROWN, J. P. H., Augusta, Ga.
BURR, W. H., Madison, Ga.
CARPENTER, L. D., Atlanta, Ga.
COLE, W. T., Newnan, Ga.
COOKE, W. H., Denton, Texas.
FRIEDRICHS, G. J., 641 St. Charles ave., New Orleans, La.
GORGAS, F. J. S., 259 N. Eutaw st., Baltimore, Md.
LOWRANCE, H. A., Athens, Ga.
MCDONALD, R. H., Griffin, Ga.
RAMBO, SAMUEL, Montgomery, Ala.
TIGNER, J. A., Rome, Ga.

MEMBERSHIP AS REPRESENTED BY STATES.

Alabama	23
Arkansas	7
California	9
Colorado	4
Connecticut	16
Delaware	1
District of Columbia	38
Florida	9
Georgia	31
Illinois	44
Indiana	8
Iowa	18
Kansas	6
Kentucky	11
Louisiana	6
Maine	2
Maryland	12
Massachusetts	24
Michigan	8
Minnesota	4
Mississippi	9
Missouri	23
Nebraska	7
New Hampshire	3
New Jersey	15
New York	81
North Carolina	24
Ohio	25
Oklahoma	4
Oregon	3
Pennsylvania	65
Rhode Island	1
South Carolina	26
Tennessee	34
Texas	10
Virginia	11
Washington	1
Wisconsin	18

Canada	1
Cuba	2
France	1
Nova Scotia	1
Philippine Islands	1

EIGHTH ANNUAL MEETING

OF THE

National Dental Association,

HELD AT

ST. LOUIS, MO., SEPTEMBER 2, 1904.

THE eighth annual meeting of the National Dental Association was held at St. Louis, Mo., September 2, 1904.

Dr. C. C. Chittenden, president, called the meeting to order at 9 A.M.

An amendment to the constitution and by-laws, changing the basis of representation in the association from all regularly organized societies to only state societies was presented, which according to the rules was laid over until the next annual meeting.

Dr. Burkhart, chairman of the Executive Council, reported that the Council recommended the appropriation of five hundred dollars to the "Congress fund," it being understood that should there be a surplus of funds after the congress affairs were settled, the amount was to be returned to the treasury of the association.

On motion the recommendation was concurred in.

Dr. Burkhart presented the following:

RESOLVED, That Buffalo, N. Y., be selected as the place of meeting in 1905, and that the time—the last week in July or first week in August—be left for decision to the Executive Council.

On motion the resolution was unanimously adopted.

ELECTION OF OFFICERS.

The election of officers was then taken up, and resulted as follows:

President—W. E. BOARDMAN, Boston, Mass.

Vice-President for the East—JOHN I. HART, New York, N. Y.

Vice-President for the South—R. K. LUCKIE, Holly Springs, Miss.

Vice-President for the West—WM. CONRAD, St. Louis, Mo.

Corresponding Secretary—CHAS. E. BUTLER, Buffalo, N. Y.

Recording Secretary—A. H. PECK, Chicago, Ill.

Treasurer—V. E. TURNER, Raleigh, N. C.

Dr. H. J. Burkhart offered a resolution to the effect that the Treasurer be

instructed to remit the dues in 1905 to all who paid at the present meeting. Action on the above to be postponed until the next annual meeting.

On motion of Dr. Ottolengui, it was ordered that when the present session adjourn it be to meet again at 5:30 P.M., to receive the report of the Executive Committee in regard to disputed credentials.

Dr. G. V. Black stated that according to the constitution a complete new election of the Executive Committee would be required, but moved that the rules be suspended, and asked unanimous consent that the members whose terms of office would expire under the old constitution be declared elected for their full term of office.

The motion was supported and carried.

The members whose terms expired at this meeting are C. S. Butler, G. V. I. Brown, and W. N. Cogan.

Dr. J. P. Gray moved that the Executive Council as at present constituted hold office for another year. The motion was supported and carried.

Dr. J. Y. Crawford stated that it had been made a duty of this association, by the action of the International Dental Federation and indorsed by the Committee on Resolutions, to designate five members to represent this country on the Executive Council of the F. D. I., and asked unanimous consent for the Secretary to cast the ballot of the association for the following-named gentlemen as such committee: B. Holly Smith, Baltimore, Md.; E. C. Kirk, Philadelphia, Pa.; Wm. Carr, New York, N. Y.; Burton Lee Thorpe, St. Louis, Mo.; A. W. Harlan, New York, N. Y.

There being objection to this action, on motion it was directed that a ballot be taken, each to cast a ballot for five names, and that the five receiving the highest number of votes be declared elected as such committee.

Dr. Ottolengui nominated Dr. C. N. Johnson as a candidate for membership on the committee.

The ballot resulted in the election of the following: Drs. E. C. Kirk, B. Holly Smith, Wm. Carr, Burton Lee Thorpe, and A. W. Harlan.

Dr. Burkhart presented the following resolution:

Whereas, James H. Worman, consul-general of the United States at Munich, has for years, in a spirit of complete disinterestedness and at great personal expense, carried on a successful campaign against bogus dental diplomas, and has also made great efforts to secure international comity in regard to reputable dental degrees; and

Whereas, In all this labor he has received the constant sympathy and support of the Government of the United States; therefore be it

RESOLVED, That the National Dental Association presents its thankful acknowledgments to the United States Government and to Consul-general Worman, and expresses the hope that Consul-general Worman will not abandon the European field, but will still continue to give the cause of international comity in legitimate dental degrees his powerful support.

On motion the resolution was adopted.

Dr. G. V. Black announced that under the new order of business there will be in each section a "senior chairman," a "junior chairman," and a "past chairman." The senior chairman will preside at the meetings of the section, and the other two chairmen will attend to the program. These officers are to be elected at this time. Dr. Black suggested that it might

be well that the rules be suspended and the President and Executive Council be empowered to elect these officers for the ensuing year only. It was so moved and seconded.

Dr. Ottolengui offered an amendment to the motion to the effect that the above selections be made from the chairmen of the sections of the past year, who were elected by the sections.

The motion as amended was carried.

The resignation from membership of the following-named gentlemen was announced: Dr. E. C. Kells and Dr. C. D. Cook.

On motion the association adjourned to 5:30 P.M.

Adjourned Meeting.

The adjourned meeting of the association was called to order by the president, Dr. Chittenden, at 5:30 o'clock.

Dr. J. D. PATTERSON, chairman of the Executive Committee, presented the following report:

REPORT OF EXECUTIVE COMMITTEE.

Meeting of Executive Committee held in the Coliseum, St. Louis, September 2, 1904. Present: Dr. J. D. Patterson, chairman; Dr. C. S. Butler, secretary; Drs. H. A. Smith, V. H. Jackson, T. P. Hinman, C. N. Johnson; and Drs. J. I. Hart and J. A Libbey, appointed by the President to fill vacancies caused by the absence of Drs. Waters and Cogan.

The case of Dr. Emory A. Bryant of Washington, D. C., who for alleged violation of the code of ethics was expelled from the District of Columbia Dental Society, was presented, but as the case was then pending in the courts, it was on motion laid over to the next annual meeting of the association, without prejudice for or against the case.

Credentials for membership in the National Dental Association from the National Capital Dental Society were received from Drs. Charles Diedel, Charles W. Cuthbertson, Starr Parsons, and Emory A. Bryant, and after due consideration, they having been found in proper form, on motion the applicants were received as delegate members.

CHARLES S. BUTLER, *Secretray.*

Dr. Burkhart gave notice of a motion to be made at the meeting in Buffalo next year, to reconsider the constitution and by-laws adopted at Asheville, N. C., and substituting therefor the original constitution and by-laws of the association, with amendments adopted from time to time, or such other amendments as may be offered when the resolution is before the Association for consideration.

TREASURER'S REPORT.

RECEIPTS.

July 29, 1903:		
Cash on hand	$365.67	
Collected since	1586.25	
Collected from So. Br.	598.00	
Received from So. Br. as donation to N. D. A.	66.00	
Received from So. Br. as donation to Dental Congress	150.00	
		$2765.92

DISBURSEMENTS.

July 30:	
F. W. Stiff, Com. on Hygiene	$25.00
J. A. Gorman, Local Com. Arrangements	6.25
J. D. Patterson, Ex. Com.	6.55
A. H. Peck, salary of Secretary	400.00
H. W. Morgan, salary of Treasurer	100.00
Don M. Gallie, Clinic Com.	2.50
C. S. Alexander, Local Com. of Arrangements	12.00
F. B. Noyes, lantern expenses.	4.50
Mrs. Elizabeth Boyd, stenographer	25.00

J. N. Crouse, Prosecuting Colleges	333.92	
Battery Park Hotel, electrical expenses for lantern	5.00	
Dr. E. Sauvez, F. D. I.	50.00	
S. W. Foster, Local Com. for badges	56.50	
August 17:		
J. A. Gorman, Local Com. Arrangements	14.50	
August 24:		
Mrs. Elizabeth Boyd, stenographer	100.00	
September 28:		
C. S. Butler, ch'man Finance Com. Dental Congress	500.00	
Richard Grady, Com. on Hygiene	34.90	
Expenses of Treasurer's office	35.20	
Contribution for So. Br. to Congress	150.00	
		$1861.82
Balance on hand July 31, 1904.		$904.10

Respectfully submitted,

V. E. TURNER, *Treas.*

ST. LOUIS, September 2, 1904.

Audited and approved: V. H. JACKSON, J. A. LIBBEY, J. I. HART.

REPORT OF AUDITING COMMITTEE.

To the National Dental Association:

Your Auditing Committee have examined and approved all of the accounts of the Association that have been presented to date.

V. H. JACKSON,
J. A. LIBBEY,
J. I. HART.

REPORT OF COMMITTEE ON CREDENTIALS.

To the National Dental Association:

Your Committee on Credentials respectfully report that they have examined and approved the Credentials presented by delegates representing the following societies:

American Academy of Dental Science—Waldo E. Boardman, Boston, Mass.; E. C. Briggs, Boston, Mass.

Harvard Dental Alumni Association—Waldo E. Boardman, Boston, Mass.; E. C. Briggs, Boston, Mass.

Harvard Odontological Society—Waldo E. Boardman, Boston, Mass.; E. C. Briggs, Boston, Mass.

Illinois State Dental Association—C. N. Thompson, Chicago, Ill.

Massachusetts Dental Society—Waldo E. Boardman, Boston, Mass.

Northeastern Dental Association—Waldo E. Boardman, Boston, Mass.

New York Institute of Stomatology—A. G. Webber, Havana, Cuba.

Oregon State Dental Society—W. A. Cumming, Portland, Ore.

National Capital Dental Society—E. A. Bryant, Washington, D. C.; Starr Parsons, Washington, D. C; C. W. Cuthbertson, Washington, D. C.

Respectfully submitted,

V. H. JACKSON,
J. A. LIBBEY,
J. I. HART.

REPORT OF COMMITTEE ON ARMY AND NAVY DENTAL LEGISLATION.

To the Officers and Members of the National Dental Association:

Your Committee on Army and Navy Dental Legislation again report progress.

The "progress" we now report is definite and tangible, and consists substantially of an agreement with your representatives whereby those who represent the War and Navy departments in such matters concede the essential for which the profession has consistently contended, namely, commissioned rank, with the recognition of the profession thereby implied, and with the social, professional, and official advantages thereby assured to the army and navy dental surgeon.

While minor details and the exact terms of the new bills to be presented to Congress at the beginning of its next session remain unsettled, your committee have grounds to expect a reasonable recognition in accordance with the departments, records, and standards of qualification of those rendering dental ser-

vice in the army and navy at the time the new act becomes operative.

Notwithstanding that uncertainty is the most conspicuous and ever-present element in the course of legislative measures, we believe that the overcoming of the heretofore successful opposition of staff officers to the profession's claim, the recognized imperative need of an adequate dental service for the army and navy, and the favorable attitude of the military and naval committees removed the last obstacle to legislation providing for army and navy dental surgeons on a commissioned basis, unless obstacles obtain in consequence of unwise, unethical, and unauthorized interference on the part of self-constituted representatives of our profession. If the long-continued and laborious efforts of your committee—supported as it has faithfully been by the most influential colleges, societies, and individual leaders of our profession, as well as by their friends in Congress—fail to accomplish the worthy object sought, it will be, in our opinion, because of the false or otherwise unjustifiable representations made by dentists who have neither authority to speak for the profession in the premises, nor data of value to offer in opposition to your committee's policy.

It should be borne in mind that your committee's conception of the prime object of its creation—as shown by the report submitted at the Niagara meeting in 1899—was the attainment of commissioned rank for both army and navy dental surgeons, but that, following the instructions given us at that meeting, we secured the enactment of the law under which the existing contract corps of army dental surgeons operate.

The contract system then in vogue of employing medical officers was accepted for dental surgeons, with the agreement on the part of Surgeon-general Sternberg that he would soon recommend a change to the commissioned status. In due time General Sternberg made the recommendation promised your committee, but it was vigorously and successfully antagonized by Secretary of War Root.

Undaunted by this failure to carry out the agreement, your committee has continuously and consistently pursued, by strictly honorable and worthy means, its original conception of the prime object of its appointment.

At the time the army contract corps was authorized by law, and, ever since, it has been quite possible for us to secure a similar civilian corps for the navy, and it was also left to us to accept or reject a commissioned rank below that of the lowest grade medical officer of the navy; but we were supported generally by the profession and by certain friends of our cause in Congress in the rejection of either a contract corps or lowest-grade commissioned rank. The latter having been proposed by Surgeon-general Van Reypen and Secretary Long in a letter dated January 29, 1902, and the contract employment of dental surgeons having been thereafter proposed several times by Surgeon-general Rixey and Secretary Moody, it became evident to your committee that some means had to be taken to secure Secretary Moody's personal attention to the subject, as well as to influence favorably the Senate and House naval committees. After conferring with friends in Congress and leading members of the dental profession as has been done with reference to every important move made by your committee—it was decided to depend almost exclusively on the dean and the president of Harvard to reach Mr. Moody. President Eliot and Dean Eugene H. Smith had already favored, in harmony with other college officers, the contention of your committee, but they accepted and carried out in the most commendable spirit the special paramount purpose of securing Secretary Moody's most favorable personal consideration of the grounds on which commissioned rank was urgently claimed.

Dr. Smith personally and through friends addressed the Navy department a number of letters with unsatisfactory results, until finally Secretary Moody wrote him, under date of February 23, 1904:

"I beg to acknowedge the receipt of your letter of the 18th instant in reference to the establishment of a dental corps in the navy, and to say that I have read your views with attention and interest. The department has approved a proposition for legislation providing for a certain number of dental surgeons on the same basis as acting assistant surgeons, now a part of the *personnel* of the medical corps of the navy. I am opposed to adding another staff corps to the navy list, and believe that the exigency to be provided for will

be met by the provision as approved by the department, and believe that the surgeons who may be attracted to the service will find their positions dignified and satisfactory. Certainly no complaint is received from the doctors of medicine who occupy positions as acting assistant surgeons at the present time. To establish a corps having the full number of higher grades is an entirely unnecessary procedure, and would lead to so many com plications at a later date that I do not think it should be at all contemplated."

A bill providing for commissioned rank was thereupon drawn by the Judge Advocate-general under instructions from Secretary Moody, and was forwarded to Congress by the department, March 3, 1904, with a letter withdrawing the several previous recommendations of the Navy department for the employment of dental surgeons by contract.

This bill was accepted by your committee as the best obtainable at the time. There was, however, an agreement with the Surgeon-general that his department would, by regulations, make the bill when enacted conform more closely to the provisions of the bill originally offered and advocated by your committee. We attach copies of the department's letter and bill, and also copies of the army and navy bills which have been advocated before Congress and the War and the Navy departments for three years.

Respectfully submitted,

M. F. FINLEY,
J. A. LIBBEY,
CHARLES S. BUTLER,
T. T. MOORE,
GORDON WHITE,
WMS. DONNALLY, *Sec'y*,
1018 14th st., N. W.

[*Inclosure.*]

NAVY DEPARTMENT, WASHINGTON,
March 2, 1904.

HON. EUGENE HALE, *Chairman Committee on Naval Affairs, U. S. Senate.*

Sir,—Referring to the department's letters of May 29, 1902, January 26, and February 8, 1904, reporting upon bills for the employment of dental surgeons in the navy, and recommending the enactment of a measure authorizing the Secretary of the Navy to employ under contract not more than fifteen such surgeons, I have the honor to state that after further consideration of the matter the department withdraws its previous recommendations in the premises, and recommends instead the passage of the measure of which a draft is inclosed. The main points of difference betweent the bill heretofore suggested and that now proposed are that the latter authorizes thirty instead of fifteen dental surgeons, and provides that they shall have the rank and pay of acting assistant surgeons, instead of being employed under contract at not to exceed eighteen hundred dollars per annum.

Acting assistant surgeons, of whom twenty-five were authorized by the act of May 4, 1898 (30 Stat., 380), to be appointed by the President for temporary service, have the rank of assistant surgeons, and receive the pay provided for the latter by section 1556 of the Revised Statutes, namely: During the first five years after date of appointment, when at sea, $1700; on shore duty, $1400; on leave or waiting orders, $1000; after five years from such date when at sea, $1900; on shore duty, $1600; on leave or waiting orders, $1200.

Very respectfully,

W. H. MOODY, *Secretary.*

REPORT OF DR. A. W. HARLAN RELATING TO THE INTERNATIONAL DENTAL FEDERATION.

JULY 22, 1904.

To the President and Members of the National Dental Association:

At the close of the third International Dental Congress, Paris, France, August 14, 1900, I was appointed a member of the Executive Council to represent one of the different groups of countries selected to organize an International Dental Federation. I made a report on the subject, which was printed on pp. 239-242 of the Proceedings of the National Dental Association for the year 1901, held at Milwaukee, Wisconsin. In that report I asked that the nominations of Dr. T. W. Brophy, Dr. E. C. Kirk, and myself be affirmed.

As the report was adopted and ordered printed, of course this was done.

At the meeting which was held in Cambridge, England, 1901, with seventeen different countries represented, Sir Michael Foster of Cambridge presiding, the Commission on Education was permanently organized, with Dr. T. W. Brophy as president.

A Commission on Hygiene and Public Dental Service also was organized at that meeting (the preliminary meetings were held in the Hotel Cecil, London, England), which was considered by the dental press to be one of the most important meetings studying dental education that had ever been held. The transactions of this meeting were published in full.

The next session was held in Stockholm, Sweden, in August 1902; representatives from eighteen countries were present. Meetings were held by the Commission on Education and by the Commission on Hygiene and Public Dental Service. These proceedings were also published in pamphlet form and quite generally distributed. At this session of the Federation an invitation was presented to the Executive Council by the National Dental Association, the National Association of Dental Examiners, the National Association of Dental Faculties, the Mayor of St. Louis, the Governor of Missouri, the Odontographs of Kansas City and Eastern Kansas, the Odontological Society of St. Joseph, Mo., the St. Louis Dental Society, the St. Louis Society of Dental Science, the Missouri State Dental Association, and the Louisiana Purchase Exposition, through its president, David R. Francis.

The formal invitation to hold a congress in St. Louis was engrossed, and it contained the names of T. W. Brophy, W. C. Barrett, and Eugene H. Smith as Commissioners. As Dr. Smith was not present on Wednesday at the opening meeting—and indeed did not arrive until Saturday of that week—the invitation was handed to the Executive Council by Dr. T. W. Brophy of Chicago, who simply delivered it without comment. After much debate and the putting off of the decision to accept or reject until the following Monday, I finally persuaded the Council to accept the invitation, and was supported by Drs. Sauvez, Aguilar, and Godon. Germany and England were opposed to the acceptance, and the Low Countries were not represented, as Dr. J. E. Grevers of Amsterdam, Holland, the member, was absent in the United States. Austria submitted the question to the representatives from that country who were present, and then agreed to the acceptance of the invitation. The Scandinavian countries did likewise, and the representative of those countries, Dr. Förberg, voted to accept.

It was claimed by those opposing the acceptance of the invitation that a congress could not be held sooner than five years from the date of the last one, held in 1900.

A committee of nine was appointed to organize the congress; but I need not go into that history now, as it is no concern of mine, and it is all ancient history and regrettable—the controversy which took place between the "committee of nine" and the "committee of fifteen" appointed by the National Dental Association.

The third meeting of the Federation took place in Madrid, Spain, in 1903. Daily sessions were held by the Commission on Education and by the Commission on Hygiene and Public Dental Service. A new commission was created at that session which is to be called the Commission on the International Dental Press. Officers were appointed, and you now have, as a result of joining the International Dental Congress of 1900, through your representative, the following:

(1) The Fédération Dentaire Internationale, composed of a general Executive Council from eleven countries;

(2) A Commission on Education, to which all affiliated dental societies and their members are eligible for membership;

(3) A Commission on Hygiene and Public Dental Service, which is open to the members of all affiliated dental societies throughout the world;

(4) A Commission on the International Dental Press;

(5) An International Dental Congress (the Fourth), to be held in St. Louis in August 1904.

As I have borne all of the expenses of going to and from Europe in 1900, 1901, 1902, and 1903, and have paid the dues of the National Dental Association in maintaining the Federation, out of my own pocket, with the single exception of the donation of fifty dollars made at Asheville, N. C., last summer, I think the least that this association can do is to approve of the work done by me, its official representative, and to order the report published in full, and also to continue me in the position for the next five years, or until the Fifth International Dental Congress shall be organized and opened in the country which will offer to hold it on the most liberal basis.

Respectfully submitted,
A. W. HARLAN,
Representative of the National Dental Association, and Member of the Executive Council of the International Dental Federation.

Adjourned till next annual meeting.

NINTH ANNUAL MEETING

OF THE

National Dental Association,

address of welcome.

The chairmen of the different sections announced the programs of their respective sections.

Dr. H. J. Burkhart, Batavia, N. Y., chairman of the Executive Council, read the recommendation of the Executive Council regarding the order of program, etc., which was unanimously adopted.

Conn.; Wm. Potter, Boston, Mass.; and Eugene H. Smith, Boston, Mass.

Dr. Burkhart then called attention to an amendment to the constitution and by-laws, notice of which was given last year, and which is as follows: "An amendment to the constitution and by-laws, changing the basis of representation in the association from 'all regularly

As I have borne all of the expenses of going to and from Europe in 1900, 1901, 1902, and 1903, and have paid the dues of the National Dental Association in maintaining the Federation, out of my own pocket, with the single exception of the donation of fifty dollars made at Asheville, N. C., last summer, I think the least that this association can do is to approve of the work done by me, its official representative, and to order the report published in full, and also to continue me in the position for the next five years, or until the Fifth International Dental Congress shall be organized and opened in the country which will offer to hold it on the most liberal basis.

Respectfully submitted,
A. W. HARLAN,
Representative of the National Dental Association, and Member of the Executive Council of the International Dental Federation.

Adjourned till next annual meeting.

OFFICIAL ANNOUNCEMENT.

Owing to the failure of the Southern Branch to furnish a report of its Eighth Annual Meeting, held at Memphis, Tenn., February 21, 22, and 23, 1905, its proceedings could not be included in this volume.

The present official Publisher is in no way to blame in this matter, as every effort was made both by the Publisher and the Secretary to procure some official report of the meeting, but without avail.

A. H. PECK,
Chicago, Ill., 1906. Secretary National Dental Association.

NINTH ANNUAL MEETING

OF THE

National Dental Association,

HELD AT

BUFFALO, N. Y., JULY 25-28, 1905.

TUESDAY—First General Session.

THE ninth annual meeting of the National Dental Association was held at Buffalo, N. Y., July 25-28, 1905.

The first general session was called to order at 10.30 A.M., Tuesday, July 25th. by the president, Dr. Waldo E. Boardman, Boston, Mass.

Rev. Wm. C. Wilbur, Buffalo, N. Y., invoked divine blessings on the deliberations of the association.

Dr. C. S. Butler, Buffalo, delivered the address of welcome.

The chairmen of the different sections announced the programs of their respective sections.

Dr. H. J. Burkhart, Batavia, N. Y., chairman of the Executive Council, read the recommendation of the Executive Council regarding the order of program, etc., which was unanimously adopted.

Dr. John I. Hart, New York, N. Y., vice-president for the East, was then called to the chair, and the president, Dr. WALDO E. BOARDMAN, read his annual address. (See page 36.)

On motion by Dr. Charles McManus, the President's address was referred to a committee of three, to be reported on at a future meeting.

The motion was carried, and the chair appointed the following as such committee: Drs. Chas. McManus, Hartford, Conn.; Wm. Potter, Boston, Mass.; and Eugene H. Smith, Boston, Mass.

Dr. Burkhart then called attention to an amendment to the constitution and by-laws, notice of which was given last year, and which is as follows: "An amendment to the constitution and by-laws, changing the basis of representation in the association from 'all regularly

organized societies' to 'only state societies,' " and moved its adoption.

The motion being supported was discussed by Drs. Diedel, Burkhart, Finley, London, Crouse, Donnally, Butler, Hinman, Bryant, Conrad, and Ottolengui, who offered an amendment to Dr. Burkhart's motion so as to read: "Only delegates shall be accepted from duly authorized state and territorial dental societies, except in the District of Columbia, and two associations from there having already been recognized, their delegates shall be received."

The amendment was lost by vote, and the original motion being put to vote was carried. The chair then announced that delegate members in the future will be restricted to regularly organized state and territorial societies.

The report of the Committee on History was read by Dr. CHARLES MCMANUS, Hartford, Conn., as follows:

REPORT OF COMMITTEE ON HISTORY.

BUFFALO, N. Y., July 26, 1905.

To the National Dental Association:

Your Committee on History begs leave to submit the following proposition:

For the past several years Dr. Vincenzo Guerini of Naples, Italy, has been compiling a history of dentistry from the earliest records down to the nineteenth century. The historical period covered by Dr. Guerini is of the utmost importance, in that it represents the basis upon which the superstructure of modern professional dentistry has been erected. Those of us who have been accustomed to regard dentistry as a modern art can have but little idea of the extent to which we are indebted to those of the middle ages, and earlier, for much that is woven into the fabric of our modern practice. The collecting and harmonizing of the data for this early historical record has been a labor of many years, by an expert specialist, and is now submitted in the English language ready for publication by its distinguished author. It has been his desire that the work shall make its first appearance in English and under American auspices.

Your committee has examined this work, and is of opinion that the National Dental Association should secure the honor of publishing this history by undertaking to guarantee the sale of a sufficient number of copies to practically cover the cost.

Your committee finds that it will be necessary to fix the retail price of the work, fully illustrated and bound in cloth, at five dollars, and that in order to guarantee the cost of an edition of 1000 copies it will require 700 subscriptions at five dollars each to insure a fund of $3500, to pay the cost of publication.

We would suggest that the association assume publication of this work, with the understanding that the book shall not be published until not less than 700 subscriptions shall have been received for it. Further, that the treasurer be authorized to receive subscriptions, and that your Committee on History be authorized to solicit subscriptions and to attend to the details of carrying the work through the press.

The conditions surrounding this proposition are such as to require your immediate action, if this association and the dental profession of America are to achieve the honor of bringing out this unique work.

The utmost asked for by your committee in the foregoing proposition is the moral support of your honorable body in carrying to a successful issue a most important phase of the work for which the Committee on History was created, and to that end we ask for favorable action upon the proposition herein embodied.

For the committee:

(Signed) E. C. KIRK,
WM. H. TRUEMAN,
BURTON LEE THORPE,
CHAS. MCMANUS, *Chairman.*

The report of the Committee on History was referred to the Executive Council.

Dr. ROBERT T. OLIVER, U. S. Army Dental Surgeon, West Point, N. Y., then read a paper on "Three Years' Service in the Philippines." (See page 45.)

The discussion of Dr. Oliver's paper was postponed until the next general session.

Motion was made and carried to adjourn until 12 o'clock Wednesday morning.

WEDNESDAY—Second General Session.

The second general session was called to order Wednesday morning at 12 o'clock, by the president, Dr. Boardman.

The minutes of the previous session were read and approved.

Dr. M. F. FINLEY, Washington, D. C., offered the following resolution:

RESOLVED, That the Executive Committee be instructed to accept the credentials of all delegates coming to this meeting, and that the amendment adopted at the previous session only become operative at the close of this meeting.

The resolution was supported and carried.

Dr. Burkhart, chairman of the Executive Council, announced the program for the present session, which on motion was adopted.

The discussion of Dr. Oliver's paper was then taken up. (See page 72.)

On motion the subject was passed.

The report of the Committee on Association Journal was read, and ordered referred to the Executive Council. (See page 16.)

Dr. R. H. HOFHEINZ, Rochester, N. Y., then read a paper entitled "The D.D.S. Abroad." (See page 79.)

The essayist, at the close of the discussion on his paper, offered the following resolution:

RESOLVED, That the chair appoint a committee of five, with full power to act, with reference to the suggestion contained in the paper; the committee to consist of one member of the Foreign Relations Committee of the National Association of Dental Faculties, one of the National Association of Dental Examiners, and three of the National Dental Association.

The resolution was supported and carried.

The chair appointed as such committee Drs. R. H. Hofheinz, E. C. Kirk, C. C. Chittenden, H. J. Burkhart, and Eugene H. Smith.

Dr. H. J. BURKHART then offered the following resolution:

RESOLVED, That it is the sense of the National Dental Association that all matters connected with the army and navy shall be transacted through the duly accredited committee of this association.

The resolution was supported and carried.

After announcement of the proposed programs for the various sections, the meeting adjourned until Thursday morning at 12 o'clock.

THURSDAY—Third General Session.

The third general session was called to order by the president, Dr. W. E. Boardman, at 12.30 o'clock, Thursday, July 27th.

The report of the Executive Council was read by Dr. Burkhart, chairman. (See report, page 16.)

The report was on motion adopted.

The next order of business was the election of officers, and the President appointed as tellers Dr. C. S. Butler, C. W. Rodgers, and J. A. Libbey.

Dr. A. W. Harlan proposed that the city of Atlanta, Ga., be chosen as the next place of meeting, and the time the first Tuesday in April.

The Secretary then read a telegram from Dr. J. A. Gorman of Asheville, N. C., inviting the association to convene there for its next meeting.

Dr. J. P. Gray proposed Lookout Mountain as the next place of meeting.

The question of the meeting-place was discussed by Drs. J. D. Patterson, J. N. Crouse, T. P. Hinman, Geo. L. Field, and J. Y. Crawford, the last-named seconding the nomination of Atlanta, and offering an amendment that the meeting be held there on the third Tuesday in September.

The resolution was supported and carried.

ELECTION OF OFFICERS.

The election of officers was then proceeded with, and resulted as follows:

President—M. F. Finley, Washington, D. C.

Vice-president for the South—Frank Holland, Atlanta, Ga.

Vice-president for the West—Wm. Conrad, St. Louis, Mo.

Vice-president for the East—L. P. Bethel, Columbus, Ohio.

Corresponding Secretary—C. S. Butler, Buffalo, N. Y.

Recording Secretary—A. H. Peck. Chicago, Ill.

Treasurer—V. E. Turner, Raleigh, N. C.

Executive Council—H. J. Burkhart, Batavia, N. Y.; Charles McManus, Hartford, Conn.; J. Y. Crawford, Nashville, Tenn.; F. O. Hetrick, Ottawa, Kans.; E. K. Blair, Waverly, Ill.

Executive Committee (three members) —J. D. Patterson, Kansas City, Mo.; H. B. McFadden, Philadelphia, Pa.; C. J. Grieves, Baltimore, Md.

On motion the Executive Council was empowered to select officers for the sections, appoint the various committeemen, etc.

Dr. Eugene H. Smith, chairman of the Committee on the President's Address, reported as follows:

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

July 26, 1905.

Your committee appointed by the chair to consider and report on the recommendations contained in the Address of the President beg leave to present the following report:

The president recommends the elimination of what he terms the absurd clause from the constitution which provides membership to those only who have received a degree from a dental or medical college since 1875. In view of the present increased facilities for acquiring a dental or medical degree, your committee do not indorse that recommendation.

The president recommends that the asso-

ciation be made a representative body, similar to the body known as the British Dental Association. The president points out that any reputable practitioner registered in Great Britain may become a member upon the recommendation of three members, one of whom shall know the applicant personally. Your committee indorses this recommendation with the provision that all applicants for membership in the National Association shall possess a medical or dental degree.

In an elaborate discussion of the present method of conducting the meetings by sections, the president recommends that section work be done away with, and that the papers now presented in the different sections be properly arranged by a committee and brought before the general assembly. Your committee have been given to understand that the section system worked badly at previous meetings, but the observation of your committee of the section work at this meeting leads them to believe that if properly conducted it may be a success. Your committee, therefore, do not feel like recommending that the section system be abolished.

The president presents the matter of the publication of the association's proceedings in a journal controlled by the association, and suggests for this purpose that a plan be devised whereby the association acquire the ownership of the *International Dental Journal.* Your committee are in accord with this suggestion, and recommend that the association own and control a journal of its own, and that a committee of three be appointed to devise ways and means to this end.

In regard to the recommendation of the president as to the establishment of a fund for the provision of aged and infirm members, your committee would recommend that a committee of three be appointed to look into the matter, and report at the next annual session of the association.

The president touches upon dental service in the army and navy, and recommends that each member of the association personally communicate with every representative and senator of his state, and induce others to the same effort, so that our representatives in Congress may be promptly appealed to to vote for the bill. Your committee being conversant with what has already been done in the way of an army and navy bill, and realizing the confusion that might come to the cause by indorsing this recommendation of the president, advise that all members communicate with the members of the committee of the association having this matter in charge, and act only under its advice.

The president discusses the matter of reciprocity, or interstate dental licenses, and suggests that the matter be brought in some manner before this association for action or recommendation. Your committee being mindful of the fact that the National Board of Dental Examiners is now strenuously striving to bring about this desired result, would recommend that no action be taken at this meeting.

In the president's discussion of the two dental degrees, he calls attention to past and present criticism in regard to this condition of things, and suggests that this association take up the matter of degrees and recommend the adoption of one degree in all the dental institutions of this country. Your committee fully realize the desirability of such a condition, and would respectfully recommend that a committee of three be appointed from this association to present the matter to the National Association of Dental Faculties.

Respectfully submitted,

(Signed) EUGENE H. SMITH,
WILLIAM H. POTTER,
CHARLES MCMANUS,
Committee.

Dr. J. N. Crouse offered as an amendment that the proposed Committee on Journal be increased to five. The amendment was accepted.

Dr. H. L. Wheeler offered a resolution that the report be adopted, with the amendment as offered; that a committee of five be appointed by the chair to consider the matter of ways and means to bring this about, and if necessary with power to act.

The motion was seconded by Dr. J. N. Crouse and carried.

On motion the session adjourned to meet at 8 o'clock P.M.

Evening Session.

The session was called to order by the president, Dr. Boardman, at 8.30 o'clock.

The chair appointed as a committee of five to devise ways and means to acquire ownership and control of a journal the following: Chas. O. Kimball of New York; Wm. H. Potter, Boston; H. L. Wheeler, New York; L. G. Noel, Nashville; B. Holly Smith, Baltimore.

Dr. Burkhart then reported that the Executive Council recommended the proceedings for the year be given to the *Dental Cosmos* for publication, which on motion was confirmed.

Also recommended that one hundred dollars be donated to Dr. Norman W. Kingsley. On motion the recommendation was accepted.

On motion it was directed also that one-half the sum of two hundred and eighty-seven dollars expended by Dr. Crouse as secretary of the committee for prosecution of the diploma mills be refunded to him by the association.

On motion it was decided that the president and Executive Council be constituted an *ad interim* committee to transact any business that may arise previous to the next annual session.

In connection with the Fourth International Dental Congress, Dr. H. J. Burkhart stated that there were sufficient funds in the treasury to defray all necessary expenses, and that the Committee of Organization had today returned to the treasury of the National Dental Association the five hundred dollars which was advanced by the association last year. The treasurer had also been instructed to pay to the Southern Branch of the National Dental Association the three hundred and fifty dollars which it had advanced.

A paper was then read by Dr. S. H. Guilford, Philadelphia, Pa., on "The Nomenclature of Orthodontia." (See page 88.)

Dr. Guilford's paper was then passed.

The next order of business was the installation of officers.

Dr. J. P. Corley, Greensboro, Ala. Before we proceed to the installation of officers, I wish to remind the association of certain action taken in 1901 which empowered the president to appoint someone to prepare a popular treatise on Oral Hygiene for the individual dentist to recommend to his patients and to the school authorities in his neighborhood. The state societies have been wanting something that they could indorse and send out throughout the country. The Southern Branch of this association, at its last annual meeting, indorsed the plan. The time has arrived, and there is no question about it, when this society should take this matter up. I therefore offer the following:

Resolved, That the president appoint at this time Dr. R. C. Grady, Annapolis, Md., to write for this association a popular treatise on Oral Hygiene, and as remuneration for such services the society shall pay him the sum of $250.

Dr. C. W. RODGERS. I second the motion.

A member asked for a rising vote on the resolution, which resulted as follows: Yeas 2,—Nays 15.

The CHAIRMAN. The motion is lost.

The newly elected president was then installed and accepted the honor with a brief but graceful address.

Dr. BURKHART offered a resolution that a vote of thanks be extended to the management of the Iroquois Hotel for the courtesies shown the association, and also to Dr. C. S. Butler for all he had done. The motion was seconded and carried.

PROPOSED AMENDMENT TO CONSTITUTION.

The following proposed amendment to the constitution of the association was then read by the secretary:

When for any reason a member of this association ceases to be a member of his state or territorial society, by that action his membership in this body is terminated.

(Signed) HERBERT L. WHEELER,
N. S. HOFF,
J. C. WATKINS.
W. N. COGAN,
T. P. HINMAN.

The President then read a letter from the chairman of the Clinic Committee, as follows:

NASHVILLE, TENN., Sept. 14, 1905.

Mr. President,—I thank you for the privilege of making this statement at this time. I feel that I owe to this association a word of explanation with reference to the clinics.

I was appointed by the president, chairman of the Clinic Committee, and finding it was impossible for me to act I called upon E. K. Wedelstaedt to take charge of the clinics. I need not mention the fact that the clinics have been well managed; they show for themselves. The National Association has never had as good a clinic since I have been attending it, some twelve or fifteen years, and I want here and now to thank Dr. Wedelstaedt for the great interest he has shown in behalf of the active clinical work of this association. No better man could have been selected to work up a great clinic, and I feel it is my duty to make this statement, although he has gone home.

Again thanking you for this privilege, I remain

Yours truly,

(Signed) J. P. GRAY.

The association then adjourned.

A. H. PECK, *Recording Sec'y.*

MINUTES

OF THE

Meetings of the Executive Council.

First Meeting.

THE first meeting was called to order by Dr. H. J. Burkhart, chairman, in the Committee-room of the Iroquois Hotel, Buffalo, July 25, 1905, at 9 A.M.

Dr. J. D. Patterson, chairman of the Program Committee, reported that the papers of Drs. R. H. Hofheinz, S. H. Guilford, and Robert T. Oliver had been selected to be read before the general meetings.

Dr. Chas. McManus, chairman of the Committee on History, requested that he be permitted to present his report to the main body. On motion the request was granted.

On motion it was directed that the proposed amendment to the constitution and by-laws be presented for action by the main body at its morning meeting.

On motion it was directed that dues be collected as usual for the current year.

On motion the Council adjourned to meet at 4 P.M.

Second Meeting.

The second meeting of the Executive Council was called to order by the chairman at 4.15 P.M.

Dr. JAMES TRUMAN, chairman of the Committee on Association Journal, presented his report, as follows:

PHILADELPHIA, June 15, 1905.

To the National Dental Association:

Gentlemen,—At the meeting of this body held at Asheville in 1903, that portion of the President's address relating to the establishment of a journal to be the organ of the Association was referred to the committee named below. The meeting at St. Louis in 1904 having been practically abandoned, your committee deemed it wise to defer any action until this meeting, 1905.

The question has in the meantime been given careful consideration. It has been painfully apparent for many years that dentistry in this country was rapidly losing its distinctively professional character, through the commercial bartering of its proceedings to the highest bidder in the publishing markets. The temptation to build up a full treasury has been the means of gradually sacrificing true professional spirit and placing an unworthy example before the rising professional generation.

Aside from this, it is equally evident to your committee that the records of our Association should be placed entirely in the hands of our own Publication Committee, and not into those of the publishers of a commercial journal, as has been the case in the past. The main question for the National Dental Association to consider is, first, the policy of establishing a journal of its own, and second,

the finances necessary to successfully continue it.

The importance of this has already been briefly stated, but it is the opinion of your committee that unless the National Dental Association is prepared to meet this question promptly, and provide the means for its accomplishment, the future of this organization as a leader in professional work and ethics is imperiled. It is absolutely essential that it separate itself from all direct connection with commercial influences.

The question of financing the journal does not come directly in the province of your committee, but this report would be incomplete without some attempt to estimate the probable cost of a journal worthy to represent this body. In order that this might be placed clearly before you, a communication was addressed to one of our largest publishing houses for an estimate of cost in the publishing of a journal of sixty-four pages. The answer to this query is appended. [Exhibit A.]

Condensed, it places the matter as follows: Cost of manufacture, a journal of 64 pages, $4800 with an edition of 2500 copies. Each additional 16 pages would increase cost from $75 to $80. Each additional 1000 of 64 pages would cost $100 per 1000 additional. Letterheads, subscription-blanks, envelopes, soliciting subscriptions, postage, miscellaneous correspondence, from $200 to $300 per month. Salaries of editors, $1000 to $2000, according to number. Business manager, $500. Commission for soliciting advertisements, 33⅓ to 50 per cent. With the exception of the commission for soliciting advertisements, an uncertain quantity, the cost of the stated number of pages would be yearly $7700, subject to variation. Advertising pages not included. (*Note:* This is a maximum estimate, and takes no account of income from advertisements, subscriptions, etc.)

Those who have had experience in this department of publication are aware of the difficulty in confining a journal of this character to four "forms" or sixty-four pages. There must of necessity be a certain elasticity to every journal, and this means increased expense. This brings the Association face to face with a serious problem. The present income is not sufficient to warrant establishing a journal with the necessarily increased outlay required. Unless the membership can be largely increased, the present yearly dues would not suffice, and were the dues increased to ten dollars on the present basis of 600 members, it would not be sufficient to do more than provide for possible deficits and for the routine expenses of the organization. This opinion is based on the proposition to establish a journal from the foundation.

At the Asheville meeting a number of the stockholders of the *International Dental Journal* proposed the transfer of that journal to the National body without cost, subject to confirmation by the International Dental Publication Company. This confirmation was subsequently effected, and the president and advisory committee of the said company were authorized to effect the said transfer at any time the National organization were prepared to accept the offer. So much time has elapsed since this offer was made that it was deemed advisable to lay the matter again before the board of managers of that company. Your committee has now the authority to announce that the company will adhere to the original offer—that of transferring, without cost, the *International Dental Journal*, provided that UNDER NO CIRCUMSTANCES IS THIS EVER TO BE TRANSFERRED TO A SUPPLY HOUSE OF ANY KIND OR CHARACTER. [Exhibit B.]

It is unnecessary to enlarge here upon the value of this offer. The *International Dental Journal* has had seventeen years of active existence. It is firmly established as a reputable professional journal. It would require no special effort to continue it under efficient management. It has, during that long period, met all its expenses, and it is safe to assume this will continue. The board of managers of the *International* are not placed in the position of offering either a weak journal or one financially wrecked. They make this offer simply in the hope that their contribution may be made of increased value to the professional life of dentistry, by becoming the organ of the National organization. With the increased facilities which this change would give, the journal would become at once equal not only to meeting all financial demands, but in the very near future to become a source of revenue to the National Association.

Your committee is therefore prepared to offer the following resolution:

"RESOLVED, That the National Dental Association accept the offer of the International Dental Publication Company, and do hereby appoint a committee of five to make the necessary arrangements for the transfer of their journal to this Association and to perfect the details necessary for the establishment of said journal as the future organ of this representative body."

Respectfully submitted,

(Signed) MEYER L. RHEIN,
RUDOLPH H. HOFHEINZ,
JAMES TRUMAN, *chairman, Committee.*

[EXHIBIT A.]

PHILADELPHIA, June 13, 1905.

DR. JAMES TRUMAN, 4505 Chester ave., Philadelphia, Pa.:

Dear Dr. Truman,—In reply to your recent inquiry, we beg to say that our usual proposition for conducting the business end of a periodical publication is somewhat as follows: We make a charge for the business management of at least $500 a year for a circulation of 2000 or less copies, and for each additional 1000 copies we make an additional charge of $100 a year. If the journal is to carry advertising which we are to manage, we would establish a rate per page, from which solicitors would have to be paid a commission varying from 33⅓ to 50 per cent.

The cost of manufacturing a journal of sixty-four pages of text and thirty-two pages of advertising, size and style similar to the *International*, in editions of 2500 copies, including postage, would be about $400 an issue. Additional 16 pages, 2500 copies, would increase the cost about $75 or $80 per issue. Additional thousands containing 64 pages, printed at the same time would cost about $100 per thousand additional.

In addition to the expenses of manufacturing the journal there would have to be taken into consideration the cost of letterheads, envelopes, subscription blanks, circulars for soliciting subscriptions and advertising, and postage on all miscellaneous correspondence, which expenditure would be regulated entirely by the amount of circularizing deemed necessary for the undertaking. Generally speaking, the journal would not expect to maintain its circulation except by continual work of this kind, and the expenditure of at least two or three hundred dollars a month must be anticipated for at least seven or eight months of the year. In addition to this is to be considered the salaries of the editors, which in all probability would cost from $1000 to $2000 a year, depending upon the number of editors employed and the amount of time devoted to the journal.

Of course, all these figures are subject to variation, depending entirely upon the publication itself, but we think that the above answers the average journal of from two to five thousand circulation.

Very truly yours,

J. B. LIPPINCOTT COMPANY,
Per Balch.

[EXHIBIT B.]

To the National Dental Association:

At an adjourned annual meeting of the International Dental Publication Company held January 30, 1904, at New York, a resolution was ordered and carried ordering the president, the chairman of the advisory board, and Dr. F. Milton Smith, acting together, to have power to conclude all negotiations necessary for the transfer of the interests of the *International Dental Journal* to the American Dental Association, on such terms as may be agreed upon between the committee of the National Association already appointed, of which Dr. James Truman is chairman, and the officers of the journal company as above mentioned.

In pursuance of the objects of this resolution the said officers of the International Dental Publication Company agree that the right, title, and interests of the *International Dental Journal*, with its corporate rights, be transferred to the American Dental Association without any monetary consideration and without other restriction except that these rights and privileges be not at any time transferred by the said National Dental Association to any business conducted, in whole or in part, in the preparation of dental appliances or remedies. Further, that it be not transferred to any person, society, or association unless accompanied with the pledge to continue its publication upon the principle established by its founders, that of an independent dental journal. It is expected that the foregoing principle of the International Dental Publishing Company will be carried out whether under the present name of the *International Dental Journal* or in any change of title thought in the future to be more in harmony with the aims and character of the National organization.

(Signed) LOUIS JACK,
J. A. WOODWARD,
F. MILTON SMITH.

On motion the recommendation was ordered read before the main body at its Wednesday meeting.

Dr. Wms. Donnally, chairman of the Committee on Army and Navy Dental Legislation, reported progress in connection with the committee's work.

On motion the Council adjourned, to meet on call of the chairman.

Third Meeting.

The third meeting of the Executive Council was called to order by the chairman Wednesday morning at 11.30 o'clock.

Dr. M. F. Finley recommended that the amendment adopted by the main body, relative to delegate memberships from state and territorial societies, shall not take effect till after the close of the present session of the association.

The motion was supported and carried, and Dr. Finley was instructed to present the above recommendation to the main body.

On motion the Council adjourned to meet at 3 P.M.

Fourth Meeting.

The fourth meeting of the Executive Council was called to order by the chairman at 3.15 P.M.

The consideration of the report by Dr. James Truman, chairman of the Committee on Association Journal, was taken up. The report was discussed by Drs. W. H. Potter, J. N. Crouse, W. E. Boardman, B. Holly Smith, Eugene H. Smith, H. L. Wheeler, and C. W. Stainton.

A report from the Committee on Clinics was received and on motion was ordered printed.

The reports of Dr. E. K. WEDELSTAEDT, secretary of the Clinic Section of the National Dental Association for the meeting of 1905, were as follows:

REPORTS ON CLINIC SECTION.

(I)

ST. PAUL, MINN., July 17, 1905.

Mr. President,—I awakened one morning to find that I had been appointed secretary of the Clinic Section of the N. D. A. Immediately following the announcement of my appointment, I received a letter from the chairman of the Clinic Section, Dr. J. P. Gray of Nashville, Tenn., who informed me that he was seriously ill and that I would be compelled to act both as chairman and secretary of the section. He desired that I at once arrange some plan for obtaining clinicians, so that a most excellent program could be arranged for the consideration of the members of the society.

The letter from the chairman was followed by one from Dr. R. B. Bogle, also of Nashville, Tenn., who informed me that he too was seriously ill and would be unable to do any work for the section. This left me eight men on the committee, and these eight men lived in eight different states.

Having ascertained that the clinic would be held at the Buffalo Dental College, that two half-days would be devoted to it, that there were forty dental chairs in the infirmary and three hundred tables for the purpose of holding table clinics, I planned as follows: That each man on the committee should obtain eight operators from his section of the country, and as many table clinics, up to thirty, as it was possible for him to procure. This left sixteen operators for your secretary to obtain, so as to make up the eighty operators necessary for the meeting.

It is a very easy matter to plan for others, but very often it is a most difficult thing to prevail upon those others to assist in carrying anything out. From the very start the life of the secretary of the Clinic Section has not been one that could be likened unto a bed of roses without thorns. This, however, is neither the time nor the place to speak of anything except that which is agreeable. It is sufficient to say that your secretary found it necessary to call upon outsiders for assistance. Dr. F. W. Gethro of Chicago, Ill., Dr. T. P.

Hinman of Atlanta, Ga., and Dr. H. S. Voyles of St. Louis, I added to the committee. It is a great pleasure to say that these men have given a good account of themselves, and that they assisted the members of the Clinic Committee in every way possible. It seems hardly necessary for me to say this, for an examination of the program which is herewith attached will tell you a far better story than any words of mine.

The secretary does not feel that an apology is necessary in presenting the program for your consideration. You will find thereon one hundred and seventy names. It is the largest clinical program which has ever been presented for the consideration of the members of the N. D. A. Had there not been other attractions going on in another section of the country at the same time, the secretary believes that it would have been an impossibility to have taken care of the clinicians who would have attended this meeting, but who have gone elsewhere, all for the honor and glory of dentistry. The uniform courtesy, the thoughtful consideration, and the nice treatment which has been rendered the secretary by each man on the Clinic Committee is something which he will not soon forget.

The secretary feels in duty bound to make a suggestion for your consideration, as well as that of the members of the National Dental Association, and it is that, in future, a general secretary should be appointed for the Clinic Section, and in each state in the Union some wide-awake man should be chosen who would act as an assistant secretary. In so far as possible each assistant secretary, upon proving himself a useful man, should be made a permanent assistant secretary for that state. If this plan were followed it would be a very easy matter to obtain such operators and table clinicians as would be representative, and each state in the Union would be represented at the annual clinic. The work of the Clinic Section should not devolve upon two individuals, viz, a chairman and secretary, as is the case at the present time.

I am a believer in holding clinics at each annual meeting. The more interesting the clinic is made, the larger will be the attendance. Unless such a plan as outlined be followed, I have a few misgivings regarding some things of which I do not care to say anything.

You have been very kind to me, Mr. President, and I thank you very sincerely for your nice treatment. May the clinic be as pleasing to the members as has been your thoughtful consideration of all my wishes.

All which is most respectfully submitted for your consideration.

(Signed) E. K. WEDELSTAEDT,
Secretary and Acting Chairman of Clinic Section, N. D. A.

(II.)

July 27, 1905.

Mr. Chairman,—The second day's clinic was much more largely attended, and the *esprit de corps,* especially among the operators, was of a different nature from that manifested at the opening day's session. Unusual interest has been displayed in the various operations and table clinics arranged for the consideration of the members. More especially was this true regarding the operations which were made by the members of the G. V. Black Dental Club of St. Paul, Minn. For personal reasons the secretary does not feel called upon to say more than this. If, however, the secretary were not an officer of the club he would not hesitate to say quite a number of things of a most interesting nature regarding the skill of the operators, their ability displayed to such a great advantage, the high standard of the operations which they made, etc. The secretary is, however, a modest man withal, and one of the elders among his people, therefore he most respectfully begs your kind indulgence and asks to be excused from saying any more.

All the clinicians rendered a good account of themselves.

The secretary desires to inform the President that the Johnson & Johnson Company supplied a large line of their specialties, and no charge was made for the same. The Kress & Owen Co.—without request from me—sent a large supply of glyco-thymoline with their compliments, for the use of the clinicians.

The dean of the Buffalo Dental College has been indefatigable in rendering every assistance that lay in his power. I do not know what I should have done without his aid.

The secretary presents his compliments to Drs. McFadden and Nichol (J. P.) of Philadelphia, Seip of Allentown, Pa., Eschleman of Buffalo, Searl of Owatonna, Minn., Lyon of

Dunkirk, and C. M. Rathbun of Fredonia. Had it not been for these interested outsiders there would not have been a clinic.

Dr. Savage of Worcester, Mass., as well as Drs. Meisburger and J. W. Beach, both of Buffalo, also rendered much assistance to your secretary. Had it not been possible to have obtained the assistance of the outsiders who were impressed, the secretary feels that by this time, instead of being half dead, he would have been wholly so.

It is with profound regret that the secretary is obliged to call your attention to the loss of a number of instruments, handpieces from engines, several dozen towels, etc. It is to be regretted, but the secretary is but one man and cannot do more than the work of one human being.

The secretary is particularly gratified with the work of his section. He feels that this is the best clinic which the National Dental Association has ever held, and he is proud, but his spirit is most humble, to know that he was the acting chairman and secretary of this section which has made such a magnificent showing for your consideration.

All of which is most respectfully submitted for your consideration.

E. K. WEDELSTAEDT, *Sec'y.*

(III.)

July 26, 1906.

Mr. President,—With exception of one or two clinicians who were detained at home on account of sickness, each clinician was present and carried out that which he agreed to do.

The porcelain operators were well worth seeing. The gold operators could not have been better. The amalgam operators were of a nature to please everybody.

The somnoform clinic was entirely successful. The surgical operation called forth much praise on account of the great skill displayed by the operator.

The table clinics were most excellent. The clinicians deserve the thanks of all members of the National, especially Dr. H. C. Smith of Boston.

The gold and tin operations pleased those who witnessed them and were surprising.

All in all, the clinic so far seems to be the best in the history of the Association.

All of which is most respectfully submitted for your consideration.

E. K. WEDELSTAEDT, *Sec'y.*

The following report of Dr. CHAS. MCMANUS, chairman of the Committee on History, was read:

BUFFALO, N. Y., July 27, 1905.

"The Committee on History requests that Dr. Wm. H. Trueman, Philadelphia, Dr. B. J. Cigrand, Chicago, and Dr. C. S. Butler, Buffalo, be added as members of that committee.

For the committee:

CHAS. MCMANUS, *Chairman.*

Dr. B. Holly Smith moved that a resolution be presented to the main body recommending the publication of a book on the history of dentistry in accordance with the report of Dr. McManus. (See page 10.)

Dr. F. W. STIFF, secretary of the Committee on Oral Hygiene, presented the following report, also the accompanying resolution:

REPORT OF COMMITTEE ON ORAL HYGIENE.

Mr. President and Gentlemen of the Association,—At the meeting of this association held in Asheville in 1903, the following resolutions were adopted (see page 210 of Transactions, 1903), viz:

"BE IT RESOLVED, That it is the sense of the National Dental Association that each Medical College in the United States should include in its curriculum a lectureship on Oral Hygiene and Dental Prophylaxis and Dental Pathology.

"RESOLVED, That a committee be appointed to communicate this action to the deans of the medical colleges in the United States, and to secure its publication in the medical journals of the country."

Your committee appointed under the provisions of these resolutions beg to report as follows:

The following letter was addressed to each of the medical colleges in the United States (both schools), 146 in number:

[LETTER "A."]

"September 14, 1903.

"*Dear Sir,*—At the meeting of the National Dental Association, recently held at Asheville, N. C., the following resolution was adopted:

" 'RESOLVED, That it is the sense of the National Dental Association that each medical college in the United States should include in its curriculum a lectureship on Oral Hygiene, Prophylaxis, and Dental Pathology.'

"Coming in close touch in their homes with so many more of the people than the dental profession, and before caries and other dental diseases have made great inroads, the opportunity of the physician is great, and his power to prevent these disorders incalculable.

"The dental profession is uniting in an effort to introduce the teaching of oral hygiene into the public schools. If we can succeed in doing this and secure at the same time the teaching in the medical colleges of so much of this subject as will enable the graduate intelligently to advise his patients regarding the care of the mouth and teeth—not only in sickness but in health as well—we will have made a great stride toward our Ultima Thule, *preventive dentistry*.

"The medical undergraduate should be taught that teeth need not of necessity be lost through the ravages of caries; he should be taught also that more teeth are lost through disease of the peridental membrane than through any other if not all other pathological conditions of the mouth combined, and he should be made cognizant of the intimate relationship existing between the general nutrition and proper mastication. The teaching should form a foundation for a correct clinical observation of oral conditions, thus enabling him to serve best his own interest as well as the interest of his patient.

"The mouth and teeth being as much a part of the human economy as the eyes, ears, larynx, etc., should be taken into account with even more consideration, since the oral cavity is the hotbed for the propagation of disease germs, whence they find ready entrance to the system at large.

"Chairs on this subject have been established in seven of the Chicago colleges, as well as elsewhere throughout the Union.

"You will greatly oblige us by answering, on the inclosed card, the following questions:

"(1) Is this or any kindred topic now taught in your school?

"(2) If so, what is the title of the chair?

"(3) If not, do you think your college could be induced to add the subject to its curriculum by the session of 1904-05?

"An early reply will be greatly appreciated.

"Very respectfully yours,

"F. W. STIFF, *Ch'man Committee.*"

Replies were received from forty-four, or thirty per cent. A careful study of these shows that the subject is taught in twenty of the colleges, although generally in connection with some other related subject. Thirteen others range from mild interest to enthusiastic concern and determination to add the course. By encouragement and persistent effort some of these would likely introduce this much-needed work.

Your committee also prepared the following letter, which was sent to all the medical journals in the United States, 250 in number:

[LETTER "B"]

September 14, 1903.

"*Dear Sir,*—Will you kindly give notice, in the next issue of your publication, of the following action of the National Dental Association at the recent meeting held in Asheville, N. C.:

" 'RESOLVED, That it is the sense of the National Dental Association that each medical college in the United States should include in its curriculum a lectureship on Oral Hygiene, Prophylaxis, and Dental Pathology.'

"The dental profession feel that with the introduction of the teaching of oral hygiene in the public schools, which they are striving to accomplish, and the co-operation of medical men who have been specially instructed on this subject, a great stride will have been made toward the prevention of caries of the teeth, not to mention many other good results to the general system, which would surely follow a better care of the oral cavity.

"If you will give this an editorial indorsement, and send me a copy of your journal, that I may make a comprehensive and intelligent report, you will very much oblige

"Yours very truly,

"F. W. STIFF, *Ch'man Committee.*"

A number of the journals complied with the request made, both in respect to inserting the resolutions and commending it editorially.

We believe that, because of the lack of time in the course for an independent chair on this subject, the object would more easily and more surely be accomplished if the proposition were made to the colleges to secure a competent dentist to deliver several lectures on the subject during the session, and we therefore suggest that an outline course of lectures be prepared to be sent to the colleges to be used by some dental lecturer of their choice.

Respectfully submitted,

F. W. STIFF, *Committee.*

SUPPLEMENTAL REPORT.

I wish to make mention of the work done by Dr. L. Ashley Faught in the city of Philadelphia. I esteem it to be the most practical and available method of opening communications with the public. The fact that it required months of patient and tireless endeavor on the part of Dr. Faught to execute his plan, convinces us that in this work there is a premium on tact and persistence.

The Board of Public Education of the First School District of Pennsylvania was induced to pass the following:

"RESOLVED, That the Board of Education approve the plan of the National Dental Association to give two or three short talks to parents, teachers, and pupils over ten years of age, provided there be no interference with the regular work, and that it be at no cost to the city.

"RESOLVED, That the Committee on Elementary Schools and Hygiene be authorized to make the necessary arrangements to carry into effect the provisions in the above-named resolution."

Widely separated sections of the city were selected; thousands of posters were stuck and distributed, and Dr. Faught made the "talks."

In writing to Dr. Grady of the matter, he has this to say: "The lectures are over, and I have learned much. First, that whoever undertakes this kind of work has to be a very versatile speaker. He has to suit himself to the audience. No cut-and-dried address will do. No reading from notes or papers. Heart-to-heart talks are the only thing. . . . I think the lectures were a success and did some good at least as an entering wedge. The request was made to come again. . . . My opinion of it all is that it is up-hill work, and that the public, both large and small, are at present not much interested in the teeth or their care—at least in Philadelphia."

Dr. Faught is not the only one who has been stunned and all but disheartened by the apathy of the public. Nor is Philadelphia the only village in this mad land where time is too precious to be wasted in mastication, and *tooth-carpenters* are to be found in every corner where oral hygiene is little known and less appreciated. Still, this very fact drives home our responsibility all the more undeniably, and also shows the unthinkable possibilities of reward.

On motion the report was accepted and ordered printed.

On motion the committee was continued, and Dr. Stiff was extended the thanks of the association for the valuable work he had done.

Dr. F. W. Stiff spoke of the intention of holding a dental congress in conjunction with the Jamestown Exposition to be held in 1908.

On motion it was directed that the Southern Branch be requested to hold its meeting at the same place with the Jamestown Exposition, and that the National Dental Association pledge its interest and support.

On motion adjourned to meet at 7 P.M.

Fifth Meeting.

The fifth meeting of the Executive Council was called to order by the chairman on Wednesday at 7.15 P.M.

Dr. Eugene H. Smith, chairman of the Committee on the President's Address, presented his report.

On motion the report was directed read before the main body.

Dr. B. Holly Smith spoke, protesting on behalf of the Southern Branch against the recent publishers of the Transactions continuing in that capacity, and moved that the matter of publication of the Transactions be taken up in the general session.

The motion was supported by Dr. W. E. Boardman, and the matter of the publication of the Transactions was further discussed by Drs. H. L. Wheeler, C. W.

Rogers, W. H. Potter, C. S. Butler, C. R. Lindstrom, J. N. Crouse, and James Truman.

The original motion being called for, was put to the vote and carried.

Dr. J. P. CORLEY, chairman of the Committee on Hygiene, presented his report, as follows:

REPORT OF COMMITTEE ON ORAL HYGIENE.

Mr. President and members of the National Dental Association,—A study of the activities of organic life teaches that the organism which is perfectly developed accomplishes the highest purpose of its existence, is in absolute harmony with its natural environment, and is, while exercising normal functional activity, immune from disease. On the other hand, the organism which is deficient in any organ or part thereof cannot present cosmic normality, and is to that extent vulnerable to disease. The generic history of a species discovers that the initial status of progeny is determined by the degree of development attained by its progenitor; while the life-history of an organism shows that subsequent development is fixed by environment.

Since the hygienist has to deal with established conditions, his first duty is, clearly, the arrest of disease. This feature of physiological science has received, and is still receiving, the greatest consideration, so we pass to the second great division of Hygiology (prevention of disease by function and environment) and study it from the standpoint of the dental scientist.

Since the discovery of the etiology of dental caries, we have recognized environment as its exciting cause, consequently the cry of the vanguard in the dental profession is "Normalize the environment!" It is a step forward from the position of the technician, who only arrests disease and restores contours, and in all probability it will be the battle-ground for ages.

However, there is a realm beyond this; her votaries take their orders from the throne-room of the goddess Hygeia, and these are they: Conserve every organ or part thereof which can be made tolerable to the system. Restore, so far as possible, all lost contour, in such a way that it will most nearly perform natural function and dwell in harmony with nature. And institute a *régime* that will provide normal environment and require functional activity. The ultimate outcome of this system will be intrinsic immunity.

The man who, under any circumstances, extracts a tooth, forfeits his birthright; and if it be done before its possessor has developed a mature facial skeleton, an asymmetry will obtain which will leave its impress on progeny. We have had a sad demonstration of this law in the involution of the third molar. Tooth-extraction and mandibular inactivity have produced an arch too small for the symmetrical accommodation of the teeth. Nor is the deformity limited to the dental armature, but the normal development of the antra, nasal fossæ, floor of the orbit, and entire osseous and muscular contour of the face is arrested.

The movement which culminated in the appointment by the National Dental Association of a committee on Oral Hygiene in Public Schools and Institutions was a natural sequence in the evolution of dentistry from a trade to a science. The initial work of the committee, composed as it was of that body of splendid men, representing the very acme of progress, developed three astounding facts: The first and most surprising was the apathy in the rank and file of the profession. The second, and most insurmountable, was the indifference of the educational authorities. The third, and most deplorable, was the widespread prevalence of dental infirmities.

Notwithstanding this threefold handicap, the committee accomplished a marvelous reformation. They aroused the interest and secured the co-operation of a powerful element in the profession; memorialized the school authorities, and awakened the interest of an unthinking and uninformed public. They inaugurated a forward movement which was not limited to the shores of the Western world, and paved the way for the development of a science into an art.

The details of the committee work have been submitted from time to time by its chairman, that consummate genius and untiring philanthropist, Dr. Richard Grady, and while the accomplished results have fallen far short of their possibilities, they have been far

more important than the casual observer would surmise. There has been a marked increase in the interest taken by state and local societies. The stolid indifference and commercial spirit of the lay dentist is giving place to toleration and sometimes enthusiasm. Timid reformers have been encouraged and converts have flocked to the standards, and altogether, the millennium has appeared *in embryo*.

Your committee has addressed eighty-three dental societies and associations, requesting information as to work recently done in this department. Of this number forty failed to reply; twenty reported no papers, while twenty reported the following:

Southern Branch of the National Dental Association, Memphis, Tenn., Feb. 21, 1905:

Dr. A. H. Fleming, Lewisburg, N. C., read a paper showing the high standard of oral hygiene being practiced and taught by the most advanced element in the profession, and emphasizing the duty of the individual dentist in instructing the public.

Dr. B. D. Brabson, Knoxville, Tenn., read a paper in which he pointed out the importance of oral activity and dental function. He claimed that modern civilized dietetics did not afford opportunity for this, and made a plea for an innovation in cooking, to the end that foodstuffs should have such physical consistence as would compel their indispensable exercise.

Dr. J. P. Corley, Greensboro, Ala., read a paper in which he maintained that a normal denture, normally environed, and participating in wholesome, hearty, and continuous exercise is self-cleansing and is therefore immune from decay; he proposed the liberal use of a pure chewing-gum as a valuable supplement to mastication, claiming that it was especially indicated during the developmental period of the dental arch muscles of mastication and facial skeleton. He declared also that its effects were highly sanitary.

Dr. W. G. Mason, Tampa, Fla., read a paper in which he traced the evolution of the human denture, and then showed how an abnormal environment had instituted an involutionary process which it was the duty of the dental practitioner to arrest, and by teaching and practicing oral hygiene, institute a *régime* which would eventually restore the dental organs and oral cavity to a perfect condition.

The discussion of this paper developed the following resolution:

"RESOLVED, First, that the Southern Branch of the National Dental Association undertake the publication of an Official Treatise on Oral Hygiene, for the public.

"RESOLVED, Second, that competition for the authorship of the treatise be open to all members of the Association, merit to be awarded by Committee on Oral Hygiene in Public Schools and Institutions.

"RESOLVED, Third, that the financial and technical details of its publication be worked out at the earliest date."

The resolutions were adopted.

At the union meeting at Basel, Switzerland, Dr. C. M. Wright read a paper on the subject of "Preventive Dentistry," in which he said that all dental operations are essentially prophylactic, but drew an important distinction between operative and sanitary prophylaxis. He recommends that prophylactic demonstrations, by experts, be made before public sanitary boards, as a means of convincing the authorities of its efficiency; and claims that such procedure would be more effective than lectures, tracts, or treatises.

The same author also read a paper before the Ohio State Dental Society on the subject "The Dental Nurse," setting forth the necessity for this specialty in dental practice. He recommends that state and local societies take up the matter in an effort to induce the dental colleges to provide such a course.

The Swedish Dental Society announces the opening of a competition for the writing of a popular treatise on Oral Hygiene, to be entitled "The Teeth and Their Care." The work is intended for distribution among the poor and uneducated, with a view to reducing dental diseases. They offer a first prize of $185 and a second prize of $80, merit to be determined by the jury of the Swedish Dental Society, and the essay to become the property of the society.

The following resolution was recently adopted by the Cleveland Dental Society:

"RESOLVED, That this society request the educational authorities in the schools of Cleveland to adopt such means and methods as will better inform student life in matters pertaining to the welfare of the teeth."

Dr. Horace L. Howe, before the Harvard Odontological Society, on April 25, 1905, read a paper entitled "The Relation of Thorough Mouth-Treatment of Food to the Affections of the Teeth," in which he traces the relationship which one part of the body bears to other parts, and the influence which it exercises on the whole. He then asserts that all foodstuffs should, before being ingested, give an alkaline reaction in order that the gastric glands may have their normal stimulation, according to the law that "An alkali applied to an acid-producing gland excites active function, and *vice versa*. He points out that mandibular exercise gives to the saliva an alkaline reaction, and since most foodstuffs are acid, this is absolutely necessary. He next sets forth that function induces development, while inactivity is followed by atrophy, and maintains that teeth and gums which have normal function are more immune than those which have not. He closes his essay by making a plea for the adoption of a regimen which will prevent rather than cure disease, and shows that, in order to our doing this, we must have the intelligent co-operation of the patient.

Dr. Raymond C. Turner, Oswego, N. Y., read a paper before the Fifth District Dental Society of New York, on the subject "Fermentation and Oral Uncleanliness," in which he described the process by which organic matter, on remaining in the mouth, was decomposed. He then deplored the appalling prevalence, in the mouths of all civilized peoples, of oral uncleanliness, and made a stirring appeal to the dental profession to be more diligent in teaching and requiring oral sanitation. He proposes the child as the most favorable avenue through which to accomplish this reform.

Dr. Clayton A. Sayers, Watertown, N. Y., also read a paper before the same society on the subject of "Oral Prophylaxis." He spoke of the excellent opportunities which the public schools afford for instruction in oral hygiene along with their study of the other sciences, and pointed out that the text-books now in use contain insufficient and often erroneous teaching on the subject. He suggested that lectures, supplemented by stereopticon illustrations, be given once or twice a year, and intimated that it may be possible to secure state assistance in the matter, since New York State furnishes sculptural, architectural, and geographical views for the illustration of those branches in her public schools. He also indorses the plan of periodical examinations and statistical records. He proposes that we appeal to our legislators for statutory support in disseminating knowledge on the subject.

Dr. G. S. Junkerman, Cincinnati, Ohio, recently read a paper before the Massachusetts Dental Society which has the unique distinction of unconditionally condemning the customary oral sanitary technique. He admits that the tooth-brush is an efficient tooth-cleanser, but says that it is a relic of barbarism, and holds it responsible for abrasion, gum recession, pyorrhea alveolaris, and the spread of dental caries. He furthermore accuses the tooth-brush of robbing the dentist of that homage which is his rightful due, and makes a plea for the dental nurse. He recommends antiseptic mouth-washes and sterilized gauze. He declares that a substitute has been suggested without any desire on the part of the writer to place a salable article on the market. He leaves to the "inventive genius" the task of devising a scientific substitute for the tooth-brush.

Your committee is unable to determine whether the essay was meant for jest or earnest, but inclines to the belief that it was a protest against the worn and unkempt brush.

Dr. W. Wythe Davis read before the Virginia State Dental Society, in August 1904, a paper entitled "Oral Hygiene," in which he assumed that systemic conditions are largely responsible for dental caries, and proposes that the dental practitioner concern himself with the general welfare of his patient. He also emphasizes the importance of functional activity and pleads for a more natural selection and preparation of food, together with normal bodily rest and recreation.

Dr. F. W. Stiff of Richmond, Va., also read a paper before the same meeting of the society, on the subject of "How to Acquire the Tooth-brush Habit," in which he details the ideal practice of a scientific dentistry. It is so pregnant with merit that nothing short of a reprint would do it justice, it is therefore with hesitation that we epitomize.

Basing his thought on the fundamental

principles of hygiene, he proceeded to outline a practical plan whereby the tooth-brush habit might be fixed upon our youthful *clientèle*. He then took up the matter of teaching oral hygiene through the public schools.

He deplores the spirit of commercialism prevailing in the rank and file of the profession, and holds it responsible for the slowness of our progress, but on the other hand rejoices in the rapid development of the altruistic dental artist. He points out that from the standpoint of remuneration alone he ultimately wins, and in that higher reward has the happy consciousness of fulfilling his destiny and helping his God to develop the perfect man.

Dr. E. A. Bogue, New York city, in writing to the committee on June 25, 1905, declared that the integrity of every member of the dental arch is absolutely essential to the maintenance of even a moderate degree of oral hygiene; that a normal condition is practically a self-cleansing condition; and that the most perfect set of teeth is the cleanest set of teeth. He recommends that public schools provide lime-water and require their pupils to diligently use it in cleansing their mouths and washing their teeth.

We have been unable to obtain for review copies of the following papers:

"Two Sources of Tooth Life and Their Relative Importance." By Dr. D. D. Smith, Philadelphia, Pa.

"Prophylaxis." By Dr. C. L. Hungerford, Kansas City, Mo.

"The Care of Poor Children's Teeth." By Dr. J. F. Hovestadt. (Massachusetts Dental Society.)

"Cause and Prevention of Recurrent Decay." By Dr. Henry Spencer. (Massachusetts Dental Society.)

"Oral Surgery and Oral Hygiene." By Dr. G. H. Glover, Huntsville, Texas. (Texas Dental Association.)

"Oral Hygiene." By Dr. H. D. Grove, Royse City, Texas. (Texas Dental Association.)

"Oral Hygiene." By Dr. G. S. Junkerman, Cincinnati, O. (Northern Ohio Dental Association.)

"A Few Practical Observations on Oral Prophylaxis." (No Name.) (Illinois State Dental Society.)

"Reports of Experiments with Antiseptic Mouth-washes." By Dr. C. R. Jackson. (Indiana State Dental Association.)

"Physicians and Dentists." By Dr. H. H. Harrison, Wheeling, W. Va. (Lake Erie Dental Association.)

"Septic Blood in Pyorrhea." By Dr. R. L. Watkins, New York, N. Y.

"Use and Abuse of Arsenic." By Dr. D. D. Smith, Philadelphia, Pa. (Central Dental Association of Northern New Jersey.)

"Surgical Treatment for the Prevention of Pyorrhea." By Dr. T. S. Waters.

"Chloasma Traumaticum of Gum Tissue." By Dr. W. A. Mills.

"Oral Sepsis." By Dr. J. E. Powers, Rhode Island. (District of Columbia Dental Society.)

"Care of the Teeth of the Poor." By Dr. W. T. Jackson, Cleveland, O. (Ohio State Dental Society.)

The work now being done gives evidence that the foremost teachers of oral hygiene are in thorough accord in their conception of the science.

Notwithstanding the splendid work done in the field of hygiene and prophylaxis, we find that many dental societies still give pre-eminence to technical attainments. However, the larger and more influential associations usually have a standing committee on oral hygiene; and aside from this, it is usually the case that the discussions of essays on the subjects of operative and mechanical dentistry, orthodontia, education, chemistry, and etiology bring out the fact that they all rest on the common basis, HYGIENE.

The great universities are realizing a fuller significance in Sir Arthur's motto—*Noblesse oblige* (nobility obligates), and have recognized the fact that educational reforms, down through the college and public school, must be initiated by them. It is this spirit that actuates the National Dental Association in taking the lead and setting the pace for the associated profession as well as for the individual dentist.

We recommend that she memorialize every known dental society upon the importance of oral hygiene, and request those not having standing committees on the subject to provide such at once. We recommend that she suggest to the various state medical associations the important bearing which oral hygiene has on the physical welfare of humanity, and call

their attention to the unique opportunity which their position offers for teaching this important branch of medical science.

In conclusion, we recommend that the National Dental Association undertake the publication of an official treatise on Oral Hygiene for the public.

(Signed) L. P. CORLEY, *Chairman*,
F. W. STIFF, *Secretary*.

On motion the report was accepted.

On motion the Council adjourned to meet Thursday at 11 o'clock A.M.

Sixth Meeting.

The sixth meeting of the Executive Council was called to order by the chairman at 11.45 A.M.

Dr. J. H. Burkhart spoke of the financial condition of Dr. Norman W. Kingsley, of New York, and on motion it was recommended that one hundred dollars be donated to Dr. Kingsley.

On motion the Council adjourned to meet at 7 P.M.

Seventh Meeting.

The seventh meeting of the Executive Council was called to order by the chairman at 7.30 P.M.

Mr. R. I. Pearson, on behalf of the *Dental Cosmos*, addressed the Council on the publication of the Transactions; as also did Dr. J. N. Crouse, on behalf of the *Dental Digest*.

Dr. J. N. Crouse presented the matter of the deficiency in connection with the prosecution of the diploma mills.

On motion it was recommended that the association pay one-half of the deficiency, which amounted to $287.

Dr. C. W. RODGERS presented the report of the Committee on Necrology, as follows:

REPORT OF THE COMMITTEE ON NECROLOGY.

Owing to the Dental Congress in St. Louis in 1904, there has been no report since the year 1903 from your Necrology Committee.

The committee report the following deaths:

Dr. Samuel Johnston Cockerille, Washington, D. C. Died September 9, 1902.

Dr. Israel P. Wilson, Burlington, Iowa. Died March 9, 1904. He was born April 12, 1837, at Mt. Pleasant, Jefferson county, Ohio. He was graduated from Missouri Dental College, March 8, 1869, and received the degree of M.D. from the Keokuk Medical College. Dr. Wilson was chairman of the committee appointed by the state society of Iowa to draft the present laws of that state. He was a member of the state society of Iowa for thirty-five years, also a member of the old American, and of its successor the National Dental Association. At the time of his death he was professor of dental pathology and histology of the Keokuk Dental College. Dr. Wilson was a prominent Mason, having held the various offices in the different masonic bodies.

Dr. Benjamin W. Simons, Charleston, S. C. Died in the forty-fifth year of his age. He was graduated in 1889 from the University of Maryland.

Dr. Clark LaMotte Goddard (see obituary notice below from the *Dental Cosmos*).

WM. JARVIE, *Chairman*.

[Obituary notices of Drs. W. C. Barrett and Jonathan Taft are also given below, with resolutions of regret as prepared by the Necrology Committee.]

Dr. William Carey Barrett.

DIED, at Bad Nauheim, Germany, August 22, 1903, WILLIAM CAREY BARRETT of Buffalo, New York.

Born in Monroe County, N. Y., on May 13, 1834, Dr. Barrett had nearly reached threescore and ten years of life. He was the son of a clergyman and was well educated, having received an academic training at Kingsville Academy, Ohio, and at Carey Seminary and Yates Academy, New York. He was a teacher for several years in several literary institutions of the state of New York.

He began the study of medicine in 1863, but changed to that of dentistry in 1864.

The Dental Society of New York in 1869 conferred upon him its degree of Master of Dental Surgery. In Warsaw, N. Y., in 1876, he began the practice of dentistry, removing in 1877 to Buffalo, where he again took up the study of medicine, receiving from the university of Buffalo the degree of M.D. in 1880. He also attended lectures at the Pennsylvania College of Dental Surgery, receiving its degree of D.D.S. in 1880.

In 1885 he became lecturer in oral pathology in the medical department of the University of Buffalo, receiving the full professorship in 1890. He also was elected professor of morbid anatomy and pathology in the Chicago College of Dental Surgery and in the dental department of Lake Forest University, etc.

The dental department of the University of Buffalo having been established in 1891, he was appointed professor of the principles and practice of dentistry and dental pathology, and became dean of its faculty, which position he held at the time of death.

From 1882 to 1888 he was editor of the *Independent Practitioner,* a monthly dental journal. In 1885 he was president of the American Dental Association. In 1891 he became editor of the *Dental Advertiser.*

He made many collections in comparative anatomy and was author of many books in dentistry and medicine. As a teacher and an author he had few equals; he was a man well equipped to teach and write. The honorary degree of LL.D. was conferred upon him by the Lake Forest University of Chicago.

He was an earnest and enthusiastic worker in every walk of life, fearless in defense of his views, an earnest teacher, a lover of his profession, and a willing champion of all who sought his help and guidance;—these are some of the qualities of his many-sided character that gave him leadership in his profession.

Resolutions.

RESOLVED, That in the death of Dr. Barrett this association has lost an enthusiastic and earnest worker, the profession a leader in the dental world, and one whose place will not be easily filled.

RESOLVED, That a page be devoted to this sketch and resolutions, and that a copy be sent to his family.

WALDO E. BOARDMAN,
E. S. GAYLORD,
Committee.

Dr. Jonathan Taft.

IT is with sadness that we announce the sudden death of Dr. JONATHAN TAFT, of Ann Arbor, Mich., which occurred at his home on October 15, 1903.

Dr. Taft came of New England ancestry, his father being a native of Massachusetts and removing to Ohio in 1818, where the subject of this sketch was born September 17, 1820, in Russelville, Brown county. Dr. Taft received his education in the public schools and in a small academy in Brown county, where he was a classmate of General Ulysses S. Grant. He afterward taught school for four years.

In 1841 he began the study of dentistry at Ripley, Ohio, in the office of Dr. Geo. D. Teter, and began practice in 1843. In 1844 he located in Xenia, where he continued practice until 1858. He received the degree of D.D.S. from the Ohio College of Dental Surgery in 1850, and in 1854 was appointed professor of dental surgery in that institution, and was dean the greater part of the time until 1879, when he resigned to accept a similar position in the University of Michigan.

In 1856 he became editor of one of the oldest dental journals in the United States, and so continued until January 1900.

He removed in 1857 to Cincinnati, where he established a large and lucrative practice, which he relinquished in the summer of 1901, when he removed to Ann Arbor, Michigan.

In 1859 he published a standard text-book on Operative Dentistry.

He established the dental department of the University of Michigan in 1875, and became its professor of the principles and practice of operative dentistry and dean of the faculty. To this department he brought the highest educational ideas known at the time, and ever since strove to keep its standard on as high a plane as the professional advancement made feasible. He became a member of every important organization for the advancement of his profession, and attended and probably participated in more dental conventions than any other man.

He was ever ready to spend time and means in the effort to advance the profession's interests through dental societies, and was probably the best-known man in the profession.

He was a strictly religious man, being a member of the Congregational Church, and

occupied a prominent place in its councils. While a man of the strongest convictions, he was ever kind and ready to make such concessions as would overcome trouble. To do right was always uppermost in his mind, and he readily made concessions which would seem for the welfare of those about him.

He became president of the American Dental Association in 1868.

Resolutions.

RESOLVED, That in the death of Dr. Taft the profession has lost an honored member, an able practitioner, author, journalist, and teacher, one universally loved and respected for his scholarly attainments and high ethical standing, an advanced thinker, and an able and enthusiastic exponent of the best in dental surgery.

RESOLVED, That the National Dental Association hereby extends its sincere sympathy to his widow in her bereavement—which is that of the whole profession; and expresses its high regard for the worth and character of this pioneer, who so ably exemplified the highest ideal in American dentistry.

RESOLVED, That a copy of this statement, in suitable form, be sent to his family.

RESOLVED, That a page in the records be devoted to this biographical sketch and these resolutions.

WALDO E. BOARDMAN,
E. S. GAYLORD,
Committee.

Dr. Clarke LaMotte Goddard.

[From the *Dental Cosmos.*]

DIED, suddenly, from valvular disease of the heart in San Francisco, California, March 30, 1905, CLARKE LAMOTTE GODDARD, A.B., A.M., D.D.S., in his fifty-sixth year.

Dr. Goddard was born in Beloit, Wis., on June 26, 1849, being the son of Elisha and Julia Goddard of that city. He was educated in the public schools of Beloit, graduating from the high school in 1868. He entered Beloit College in the autumn of that year, graduating with honor in 1872 with the degree A.B. He then decided to prepare himself for the profession of dental surgery, matriculating in the Philadelphia Dental College, Philadelphia, Pa., in October 1872, and after completing the course with great credit to himself and honor to his alma mater, he was graduated in the class of 1874 with the degree D.D.S.

Immediately upon his graduation he became associated in practice with Dr. A. E. Brown of Chicago, Ill., but at the end of a year severed his connection and removed to San Francisco, Cal., arriving in that city March 17, 1875. In the same year his alma mater conferred upon him the A.M. degree. For about a year after his arrival in San Francisco he was associated in practice with Dr. J. L. Cogswell. Later he entered the office of Dr. H. E. Knox, remaining with him for about eight years. In 1884 he opened an office under his own name, where his large acquaintance, superior attainments, and professional skill soon won for him a large and lucrative practice. During the last fifteen years he had associated with him in practice his nephew, Dr. H. D. Noble.

Dr. Goddard was a man of studious habit, of an analytical turn of mind, of great mechanical ingenuity, and superior manipulative skill, all of which combined to make of him a practitioner of pre-eminent ability. His studies were, however, never wholly confined to his profession, for he was a man of broad culture and large general scientific attainments. He, with others, was instrumental in the organization of a dental department of the University of California, which was incorporated in 1881.

He was elected by the Board of Regents of the University of California to the professorship of mechanical dentistry, and retained this position from the opening of the dental department in 1882 to the end of the college year 1889, when he resigned that chair to accept the professorship of orthodontia, which he held from 1890 to 1902. He was dean of the dental department in 1883, and again in 1886-88 and 1899-1902. He severed his connection with the dental department at the close of the college year 1902, much against his own inclinations and the wishes of his associates, after a faithful, devoted and self-sacrificing service of twenty years. This step was taken as the result of his physical condition and at the dictates of prudence. Only his intimate family associates were cognizant of the physical condition which forced him to lay down his college work, consequently his sudden and untimely demise came as a great

shock to his associates, friends, and acquaintances.

Dr. Goddard was endowed with qualities which made him a teacher *par excellence*. He possessed in an unusual degree the ability to impart instruction and the power to stir enthusiasm in his students for any subject that he might present to them. As a consequence he was always a popular teacher, and he succeeded in impressing his genial personality and studious habits upon his students to such a degree that they became thereafter his faithful emulators and his life-long friends.

As a professional man and a teacher he was always found in the ranks of those who were striving for higher professional ideals and for broader culture as a pre-requisite for entrance upon professional study. It was largely through his efforts that the preliminary requirements for entrance to the dental department of the University of California and the length of the academic year were constantly kept a little in advance of the requirements of most other dental schools. His contact with his professional brethren was always that of the high-toned ethical gentleman. His discoveries and inventions along the lines of his profession were always freely given to his *confrères* for the benefit of suffering humanity. He was never known to speak unkindly of anyone, and never allowed himself by speech or action to unjustly criticize a professional brother.

He was a man of extreme modesty and of a highly sensitive nature, consequently a personal injustice cut him to the quick. And yet his nature was so forgiving that he always made excuses for those who had treated him unkindly or tried to injure him. He rarely resented a personal injury or an unjust criticism, but he could not endure to hear his friends maligned or see them injured without making a vigorous protest.

Socially he was of genial disposition, devoted to his friends, a royal entertainer, and a charming host. His home life was ideal. The expression of his affection for the members of his family was most beautiful in its quietness and modesty. His home was the center of his life, but from it was radiated a great love and a generous liberality toward all who might need a helping hand. No one ever appealed to Dr. Goddard when in distress to be turned away empty-handed. He was generous to a fault, and yet he did not dispense his gifts with a careless or a thoughtless hand. Fortune had been kind to him, and so far as his means allowed he took delight in contributing to the happiness of others.

Dr. Goddard was a man of more than ordinary literary attainments, being a frequent contributor to the periodical dental literature. He was one of the collaborators of the "American Text-Book of Operative Dentistry," having prepared for that volume the chapters on the "Management of the Deciduous Teeth" and "Orthodontia Exclusively as an Operative Procedure." At the time of his death he had just completed for the use of students a handbook on Orthodontia which it is hoped his heirs will have published. During the later years of his life he devoted considerable time to the study of comparative odontology, having gathered together a large variety of skulls and teeth. He had also instituted a series of studies of the cingules and cusps of the human teeth, with a view to clearing up certain questions relating to their evolution. These studies, it is to be regretted, were still incomplete at the time of his death.

He was a member of the Delta Sigma Delta Fraternity, and took an active interest in both its local and national affairs.

He has been frequently honored by the profession, having been elected president of the San Francisco Dental Association in 1891; president of the Oakland Dental Club in 1898; chairman of Section VII of the World's Columbian Dental Congress, held in Chicago in 1893; chairman of the Dental Section of the American Medical Association held in San Francisco, Cal., in 1894; vice-president of the National Association of Dental Faculties in 1893; president of the Pacific Coast Dental Congress held in Portland, Oregon, in 1898, and at the time of his death was a member of the Committee on Essays of the Lewis and Clark Dental Congress to be held in Portland, Ore., in July 1905.

He was very fond of travel, having visited Europe several times with the various members of his family. Photography was his hobby, and he indulged his love of the beautiful by making photographs of scenes that appealed to his esthetic sense.

Dr. Goddard was married to Miss Louise Bunker of San Francisco on August 30, 1881.

This union was blessed by the birth of two children—a son Malcolm, now in the University of California, and a daughter, Florence, who is in the graduating class of the Miss Head Seminary, Berkeley, Cal.,—who with their mother remain to mourn their great loss.

His loss to the profession which he so much loved is irreparable. The influence upon the world of such lives as his are beyond estimation, and it is difficult to understand why they should be removed or how they can be spared. Few men in the profession have been so greatly loved and respected as was Dr. Goddard, and no man in the community in which he lived will be more greatly missed or more sincerely mourned. His was a great nature, and his heart went out to everyone in love and sympathy. *Requiescat in pace.*

J. S. M.

On motion the report of the Necrolcgy Committee was accepted and ordered printed.

The report of the Treasurer was as follows:

REPORT OF THE TREASURER.

Receipts.

1904.			
September 2	To amount from last statement	$904.10	
	Received from Southern Branch	10.00	
	" on pages 2, 4, 6, 8, 10, 12, 14, 16, and 18	1155.00	
			$2069.10

Expenditures.

September 2	By amount paid A. H. Peck (Secretary's salary)	$400.00	
"	" " V. E. Turner (Treas.' salary)	100.00	
"	" " A. H. Peck (printing)	20.00	
"	" " " (postal cards)	1.50	
"	" " " (printing delegates' certificates)	2.70	
"	" " " (postal cards)	9.80	
"	" " G. H. Grimm (badges)	10.00	
"	" " Wms. Donnally (Naval Legislation)	97.00	
"	" " C. C. Chittenden, pres. (postage)	5.00	
3—	" " " C. S. Butler (for Dental Congress)	500.00	
9—	" " " J. N. Crouse	120.00	
1905.			
March 25	By amount paid Wms. Donnally (Naval Legislation)	172.32	
"	" " Gunthorp, Warren & Co. (print'g)	55.50	
"	" " Mrs. C. S. Boyd (stenographer)	10.00	
"	" " A. H. Peck (expenses)	26.45	
June 10	By amount paid T. P. Hinman (Clinic program com.)	100.00	
July 20	" " " Expenses Treasurer's office	39.50	
			$1669.77
	Balance on hand		$399.33

July 25, 1905.

V. E. TURNER, *Treasurer.*

Audited and approved: V. H. JACKSON, W. N. COGAN, F. S. WATERS.

The Auditing Committee reported that it had examined the books and accounts of the officers and found them correct.

The Credentials Committee presented its report, as follows:

REPORT OF CREDENTIALS COMMITTEE.

BUFFALO, July 1905.

Your Credentials Committee would respectfully report that they have examined the credentials of all delegates and have placed the same on file.

V. H. JACKSON,
T. S. WATERS,
W. N. COGAN,
Committee.

American Academy of Dental Science—Waldo E. Boardman, Boston, Mass.

Pennsylvania Association of Dental Surgeons—Wm. H. Trueman, Philadelphia.

Alabama Dental Association—Louis H. Rambo, Montgomery, Ala.

American Academy of Dental Science—Ned A. Stanley, New Bedford, Mass.

Academy of Stomatology—Dudley Guilford, Philadelphia.

American Academy of Dental Science—L. S. Chilcott, Bangor, Me.

American Academy of Dental Science—Boston.

Chicago Odontographic Society—Chas. R. E. Koch, Chicago, Ill.

District of Columbia Dental Society—J. W. Boynton, Washington, D. C.

Fraternal Dental Society of St. Louis—Burton Lee Thorpe, St. Louis.

Georgia State Dental Society—Nat G. Slaughter, Athens. J. H. Lorenz, Atlanta.

Harvard Dental Alumni Association—Waldo E. Boardman, Boston. Ned A. Stanley, New Bedford. Murdoch C. Smith, Lynn. Eugene H. Smith, Boston. Elbridge A. Shorey, Dover, N. H.

Iowa State University—C. M. Work, Ottumwa.

Iowa State Dental Society—P. H. Jones, Clear Lake. John V. Conzett, Dubuque. G. W. Eshleman, Cherokee.

Kansas State Society—F. G. Corey, Council Grove.

Kansas State Dental Association—F. O. Hetrick, Ottawa.

Maryland State Dental Society—H. E. Kelsey, Baltimore. Geo. E. Hardy, Baltimore.

Massachusetts Dental Society—Carl R. Lindstrom, Boston. Waldo E. Boardman, Boston. Charles E. Parkhurst, Somerville. Ned A. Stanley, New Bedford. Murdoch C. Smith, Lynn. Eugene H. Smith, Boston.

Missouri State Society—Val. H. Frederick, St. Louis. James W. Hall, Kansas City. Earnest P. Dameron, St. Louis. Burton Lee Thorpe, St. Louis.

New York Institute of Dental Technique—Frederick Crosby Brush. F. L. Fossume, New York city.

New York Institute of Stomatology—F. Milton Smith, New York city. J. Lowe Young, New York city.

Northeastern Dental Association—Waldo E. Boardman, Boston. Geo. E. Savage, Worcester, Mass. Ned A. Stanley, New Bedford, Mass.

New York State Dental Society—F. W. Lowe, Buffalo. J. W. Beach. Herbert A. Pullen. Martin C. Tracey, Marshalltown. Gladstone Goode, New York city. F. A. Greene, Geneva.

New York State Society, Seventh District—Elmer R. Griswold, Dansville. Geo. B. Mitchell, University of Buffalo. W. H. Povall, Mt. Morris. Geo. T. Moore, Mt. Morris.

New York State, First District—Wm. Bailey Dunning, New York city.

Oklahoma Dental Association—C. H. White, Oklahoma city.

Pennsylvania State Dental Society—H. W. Arthur, Pittsburg. E. J. Donnegan, Scranton. W. L. Van Buskirk, Scranton.

Wisconsin State Dental Society—Wm. Gird Beecroft, Madison, Wis. C. C. Southwell, Milwaukee, Wis.

Dental Corps of U. S. Army—Robert T. Oliver, as per War Dep't special order:

SPECIAL ORDERS, No. 157. } WAR DEPARTMENT, WASHINGTON, *July 10, 1905.*

Extract.

. . . . . .

2. Examining and Supervising Dental Surgeon *Robert T. Oliver*, United States Army, is detailed to represent the Dental Corps of the Army at the annual meeting of the National Dental Association to be held at Buffalo, New York, July 24 to 29, 1905, and will proceed to Buffalo in time to attend the meeting, and upon

the adjournment of the Association will return to its proper station. The travel enjoined is necessary for the public service. [1033820, M.S.O.]

. . . . . .

BY ORDER OF THE ACTING SECRETARY OF WAR:
ADNA R. CHAFFEE,
Lieutenant General, Chief of Staff.

OFFICIAL:
F. C. AINSWORTH,
The Military Secretary.

Presdt, N. D. A., through Surgeon-general.

The report was on motion accepted.

Dr. H. R. McMichaels reported that the handpiece had been stolen from his engine at the clinic. On motion it was recommended that the doctor be reimbursed to the value of the instrument.

On motion the usual salaries of the Secretary and Treasurer were ordered paid.

On motion it was recommended that the President and Executive Council be constituted an *Ad interim* Committee to transact any business that may arise previous to the next annual meeting.

The bill presented by the Buffalo Dental College in connection with the expense of holding the clinic was taken up for consideration. After some rather drastic discussion the bill was ordered paid.

On motion it was recommended that the Transactions be accorded The S. S. White Company for publication, on condition that they pay the bills of the various stenographers and furnish at least eight hundred (800) copies without expense to the Association.

The following resolution from the Southern Branch of the National Dental Association was presented, and on motion was adopted:

Your Executive Committee makes the following report upon the questions referred to the committee at the afternoon session, Friday, February 21, 1905:

First. In the opinion of the committee, Article XVIII, Section 6, of the Constitution of the National Dental Association establishes the fact that members of the Southern Branch can only be received from the states apportioned to the Branch, viz, Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, West Virginia, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, Arkansas, Oklahoma, and Indian Territory.

Second. The Executive Committee of the Southern Branch of the National Dental Association resolves—to establish the status of the members of the National Association in the meetings of the Southern Branch: That any member of the National is entitled to all the privileges of the floor and to vote upon any question except such questions as involve purely the local interest of the Branch, such as election of officers, fixing place of meeting, etc.; and that this ruling be referred to the Executive Council of the National Dental Association for their approval.

The above is a true copy.

(Signed) J. H. CROSSLAND, *Rec. Sec'y, Southern Branch N. D. A.*

Dr. F. W. Stiff requested that Dr. Burton Lee Thorpe be appointed by the N. D. A. to act with himself (Dr. Stiff) and Dr. Walker, in connection with the proposed Jamestown Dental Congress.

On motion Dr. Thorpe was so appointed, with the understanding that the N. D. A. shall in no way be responsible for the financing of the Congress.

REPORT FROM EXECUTIVE COMMITTEE.

The regular annual meeting of the Executive Committee was held at the Hotel Iriquois, at 9.30 A.M., July 25, 1905. Present—Dr. J. D. Patterson, chairman; Dr. C. S. Butler, secretary; Drs. Waters, Hinman, Jackson, Smith, and Cogan. The matter of the ethical status of the National Capital Dental Society of Washington, D. C., was taken up, and after an informal discussion it was moved and car-

ried "That the National Capital Dental Society be investigated, and that all credentials from that society be held pending said investigation." Drs. Jesse B. Schafhirt, Chester B. Beatty, James A. Hunter, and Emory A. Bryant presented credentials as delegates from said National Capital Dental Society, which in accordance with the above resolution were held by the committee.

On motion a recess was taken until after the annual election, when on re-convening Dr. J. D. Patterson of Kansas City was elected chairman, and Dr. C. S. Butler of Buffalo secretary. On motion the divisions of the Executive Committee remained as last year; Dr. H. B. McFadden taking the place of Dr. H. A. Smith, and Dr. C. J. Grieves of Baltimore, Md., that of Dr. Waters in Division II. There being no further business the committee adjourned.

(Signed) CHARLES S. BUTLER, *Sec'y.*

On motion the report was accepted.

On motion the Council adjourned, subject to the call of the chairman.

Eighth Meeting.

The eighth meeting of the Executive Council was called to order by the chairman on Friday morning at 10 o'clock.

On motion Dr. H. J. Burkhart was elected chairman for the ensuing year.

The Council then proceeded to appoint the various officers of the sections, the various committeemen, etc., for the ensuing year. (See pages ix–xiii.)

On motion the Council adjourned.

A. H. PECK,
Recording Secretary.

Annual Address.

By WALDO E. BOARDMAN, President.

IT is with pleasure that I welcome you, as members of the National Dental Association—a scientific body representing all sections of the country, an organization bringing together men for the interchange of ideas and the advancement of knowledge, not only for the benefit of each of us, but for that of the people at large.

Within this gathering let us by unfettered discussion look at questions from every point of view, by the reconciliation of jealousies and differences, by mutual concession, compromise, fairness, and honesty of purpose, a recognition of mutual rights, forebearance, and human sympathy and charity, ever bearing in mind the axiom, "the greatest good to the greatest number."

The coming together of men of varying degrees of learning, the contact with those of intellect, radically differing in many respects, teach us that professional knowledge and achievement is not centered in oneself alone. We can all profit intellectually, socially, and professionally by entering into the spirit of the occasion.

One reason for our non-success as to recognition with the learned professions is the lack of cultivation and discernment, which our calling justifies. We are what we have made ourselves, if our standing does not rank on the same plane as theology, law, and medicine, it must be due to failure to educate the laity to that standard; and there we will remain until we brush aside contention and strife and cultivate those qualities necessary for our profession to take such rank.

Animated by those sentiments which characterized the action of this association, at its meeting held in St. Louis, in elevating the speaker to the office he now holds, it is the wish that that spirit of unanimity may pervade all its deliberations during this session—believing that here we have an aggregation of men devoted genuinely to its service and sincerely anxious for the preservation of high aims and a fair name. With such sentiments animating the members here assembled, the record of this meeting ought to prove the most honorable and creditable within its history.

But intellectual progress does not include everything, nor does chasing the dollar; there is something more in life. The tendencies toward commercialism in our profession, if not checked, will surely lead to degradation. We want to see this association equal to the new demands of the new days, hence I shall offer a few recommendations for your consideration.

Membership. In his annual address delivered in 1903, President Noel reported a membership of 620; today the treasurer informs me that we have 645. This, however, is too low an average from the 35,000 dentists in the United States. For a national scientific body we should easily show 6000 in lieu of a paltry 645. Why should there be this paucity of members? How shall we increase our membership?

By brushing aside antiquated rules in our constitution; placing in the Council of this association young men of energy and ability, who will bring to it the enthusiasm of youth; by interesting all dentists through our state organizations, by admitting ethical practitioners, whether graduates from colleges or not, and by making this a representative body instead of a delegated organization.

The British Dental Association has 1300 members in a total registration of 4676 dentists in Great Britain, and their requirements for membership are that any reputable practitioner, registered in Great Britain, who practices ethically—upon the recommendation of three members, one of whom shall know the applicant personally—may become a member.

The 1875 Clause. The constitution denies membership to those who have not received a degree from a dental or medical college since 1875. Many practitioners since that date have entered dentistry without that qualification, better fitted to practice than many who have since received a degree. All the states and territories now have laws regulating the practice of dentistry and the examining boards of these several states and territories are well equipped to safeguard the interests of the public and incidentally this association. I therefore recommend the elimination of this absurd clause from the constitution.

Balloting for Delegates. Another clause, referring to the various state and local societies balloting for delegates to represent their respective organizations in this association should be eliminated. These different societies hold meetings at varying seasons of each year, making it impossible to keep track of dates, and more often than otherwise the time has passed before it is known. Unless the representative character of our association takes the place of the delegate system as previously recommended, I suggest that the president and secretary of each society be authorized to issue and sign all delegate certificates, without formal ballot.

There can be no harm in this method, for should any society through these officers send undesirable men to represent it in this association, our organization has the power by investigation or otherwise to prevent their admission, or for expulsion afterward. It is not, however, reasonable to suppose that reputable societies, knowingly, will transgress in any such manner the rules of this association.

The New Constitution of 1903: Sections. The present constitution, being a revision of the old rules adopted at Asheville, N. C., in 1903, known as the "Black amendments," now for the first time in effect, provides separate meetings in three sections instead of six as formerly. What I might say upon this subject can be better expressed by quoting the editor of a well-known dental journal of this country, which quotation fully coincides with my views. He says:

"It has been the opinion of the writer

—since the movement toward separate and simultaneous section meetings for the reading of papers and their discussion in our national bodies has gained force—that the old plan in vogue in the American Dental Association was the wisest, and added most to the interest and secured the larger attendance at those meetings. The recent experience at the congress in St. Louis has only confirmed that opinion. If in the profession of dentistry section meetings were demanded, surely the demand and the necessity for the demand would have presented at a World's Dental Congress. Instead of this, the experience at the congress has only shown to the observing that section meetings have signally failed, and that a large majority are opposed to them and desire a less complicated method to arouse and concentrate the interests of all."

The National Dental Association adopted new rules providing for separate meetings in three sections and while it may be said that the new plan has had no trial, yet it is fair to judge of the outcome in the light of recent experience, and that the plan is faulty so far as our profession is concerned. There has been —and we believe always will be—a paucity of interest and attendance in some of such section meetings, and a confusion of wandering interest as to which is the most desirable to attend; so that a positive disadvantage will always be manifest.

Another writer says that it has been correctly stated that in the medical profession, with its long array of specialties, it is appropriate and necessary to have those specialists meet in separate rooms and hold separate sessions; but in our profession specialties are in embryo, and only one, that of orthodontia, can at all be considered a specialty. Even orthodontia can scarcely be so considered when all dental practitioners practice the art, and only less than a score in the whole country of the United States are exclusively engaged in the work.

Three sections, as now provided for in this association, will we believe present the objections to separate section meetings just as prominently as if there were a greater number; and if the old rule in the American Association had been continued and properly lived up to, there would have been no need to ape the methods of medical organizations with large membership in this or any other country. In my opinion the trouble is that the old methods were so poorly lived up to that the new ones had to be broached.

If section officers had but done their duty, and in the afternoon of the first day of meeting had insisted upon the presentation of all papers, and voted as to their merits without discussion, as to whether they should be read before the main body or not; and if the presiding officer of the main body, when such papers were presented, had promptly and positively controlled the proceedings and cut out all the nonsense that presiding officers are disposed to admit, there never would have been any movement for distinct section meetings for the presentation and discussion of papers, and it would have been found in all cases—as it was in some—that there was plenty of time to hear all acceptable papers and the discussion upon them. At the very meeting in Asheville where the separate section meeting rules were adopted, the time was frittered away and the association more than once adjourned because there were no more papers to read.

This brings us to the gist of these remarks, and it is this: At a dental meeting, let those be selected to arrange the program and to preside who think more of their profession and the scientific success of the meeting than of their after-dinner coffee; men who will demand that sessions open promptly, will brush aside extraneous interests, and confine the association to the legitimate business for which it was created. Then we would have less of wondering what had come over the spirit of our National Association, and less of the talk for separate sectional meetings. It ought not to be a physical impossibility for any member to hear all the papers; on the contrary, it should be made possible for every man to hear every paper.

Remedy. The chairmen of the several sections should procure a limited number of papers on the various subjects named in their respective sections, limit them to a certain number of words, say two thousand, the papers to be in their hands a month previous to the meeting. Reject all papers not original in scope, then let each section have a day and evening in general meeting for their papers, or Section I could have the afternoon of the first day; Section II the evening; Section III afternoon of second day; then Section I that evening; Section II next afternoon; Section III that evening, and so on till all papers have been finally presented, reserving the last day for general business of the association.

It is much better to have ten good papers presented in each of the three sections than to have twenty with half of them of questionable value. It is unfair to the essayist to ask him to contribute a paper which may have taken weeks or months in its preparation, and then find the section so crowded that it must be read by title.

Having had considerable correspondence and interviews with others upon this subject since the congress of a year ago, I have found at least ninety per cent. of those who contributed to the work of the congress and of this association diametrically opposed to any more section work for them in this body, and this has been the writer's view since first he became a member of this organization, only to be fully convinced as the years have rolled on.

The meeting should promptly begin on time, and if so carried out I am convinced that the meetings will be better attended and of far greater importance than under the present system. It is with this object in view that he desires this idea tried at the present session, and if it works satisfactorily to the greater body of dentists here assembled, the constitution can then be arranged in accordance therewith.

State and Local Society Delegates. One of the privileges of our constitution is that of inviting state and local organizations to send delegates to the National Association and on presentation of their credentials be made permanent members. This privilege in the past has in some instances been abused by reason of delegates using their state or local society as a vehicle to gain admission into this association, and, once in, of resigning from said state or local society. This injures the state society especially; every ethical dentist ought to be a permanent member of his state organization, thereby aiding it and the authorities in upholding and enforcing laws enacted for the good of themselves and the public, likewise assisting the state boards of

dental examiners in their sphere of usefulness.

Unless this association be made a representative in lieu of a delegate body, I recommend an amendment to the constitution barring all societies except the state societies from sending delegates to this body, and from whatever cause membership is severed, from that moment they shall cease to be members of this association—with the right, of course, in all cases, of appeal to this body.

Rules for Presiding Officers. It seems to the writer that many of the rules pertaining to the presiding officer might be abolished, for they go so minutely into how and in what manner the president shall preside, that in the short period of one year among his other multitudinous duties, the president has little time for their study; it is utterly impossible for the average man to preside according to the rules as stated. No similar body within my knowledge has so many absurd rules hampering the presiding officer in the discharge of his official duties as this one. The shorter and fewer the rules, the better for an organization where scientific papers and their discussion are considered. The presiding officer should be guided by as few rules as possible consistent with the preservation of order and his own sense of duty.

Publication of the Proceedings. The publication of our proceedings has in recent years been of an exceedingly unsatisfactory character, and it therefore seems wise to move in other directions. Abolish the present method of farming out the Transactions, and in place thereof have a journal of our own modeled on the order of that of the British Dental Association, or the American Medical Association.

Much discussion has been given in committees and in the Executive Council relative to the feasibility of a scheme of publishing our Transactions in a journal of our own, but for various reasons, chiefly the financial, it has failed to materialize. From all information bearing on this question it seems that a scheme might be evolved whereby we could take over the *International Dental Journal*—for I understand it can be had free from all debts or expense to this association—and various dental societies are ready to assist in material and financial resources.

The association should have entire charge of its publication, with a competent editor-in-chief and a business manager, not a dentist, to conduct the business feature of this enterprise. The association should contribute a sum of money from its treasury yearly and such societies as desire to do so may contribute from their respective treasuries to create a fund for the conduct of said journal; those societies contributing to the cause in both, proceedings and financial, to have a free copy mailed to each member of the contributing organizations. In the British Dental Association, each member receives free a copy of the *Journal of the British Dental Association,* published twice a month. In this way the association would have an organ worthy of the name, and the contributing societies would also have a journal of greater merit than now. This would eliminate the question of finance to a great extent in organizations, and also the trade journal feature so much abhorred by many practitioners. The publication of the journal, in my opinion, should be in

either Boston or New York, preferably the latter.

I therefore recommend and strongly urge that this matter be placed in the hands of a committee with power to act.

Provision for Aged and Infirm Members. We need funds for this purpose instead of allowing worthy and aged members to become paupers and be sent to the almshouses, or allowing them to beg at our homes and offices, on the strength of acquaintanceship with some relative, friend, or preceptor. There should be ways and means provided and a committee of relief formed to take charge of all such cases and see that they are properly cared for.

At its last meeting in Southport, England, the British Dental Association reported thirty-four new subscribers to a fund for various charitable purposes. That association has an invested capital of about ten thousand dollars. Under its benevolent fund during the year ending April 30, 1905, ten dentists received aid as annuitants, mainly aged and infirm members. One who recently died had his funeral expenses allowed. Increase of grant was made and half of debts paid in the case of one annuitant, his friends paying the remainder. Two other dentists were assisted temporarily and twelve widows, annuitants, some with families, were helped. One new case accepted had creeping paralysis. To four daughters of once prosperous men, small annuities were given. Copies of paper on the "Benevolent Fund" were sent to all non-subscribers. One boy elected to St. Anne's Redhill; one girl elected to Wolverhampton. Before these elections they had five boys in homes and orphanages, and one of these passed the junior Cambridge examinations in December last. I recommend that some plan be formulated for the collection of a fund for the purpose above mentioned, to be known as the Benevolent Fund.

Army and Navy or Public Dental Service. The committee on the above deserve great credit for success in having reported to the last session of the Congress a bill providing for dentists in the navy with rank, and I would here suggest and strongly advise that each member write or interview members of Congress within his district, asking them to do all within their power to further the interests of the bill to a successful conclusion.

The writer personally communicated with every representative and senator of his state and induced others to the same effort, so that our representatives in Congress were promptly appealed to to vote for the bill. In all instances replies were returned, nearly all stating that they would do all that was possible for its passage, while several replied that the matter would receive their most earnest attention when the bill comes before Congress for debate. If each member will do the same, no doubt the bill will, at the next session of Congress, be enacted into law.

Branches. It is a singular fact that one of the hardest problems to accomplish is the organization of branches similar to the Southern. For several years the writer has directed energy in that line relative to an Eastern branch, and while aided by good advocates and assistants has failed in infusing enthusiasm. In our profession it does seem that the average person is not broad-minded enough to see beyond his own environment, otherwise the association would be numerically larger. The writer, how-

ever, believes that failure is to a certain extent due to the existence of too many dental societies.

Fourth International Dental Congress. This congress has passed into history. Members of the organization committee now realize what it had to contend with from the outset. The misunderstanding between this committee and that appointed on behalf of the Fédération Dentaire Internationale was an unfortunate incident, and was due to the character of the instructions which the latter committee had been directed to carry out. The settlement of the question involved was so long delayed that when final decision was made there was practically but one year for the accomplishment of the object sought, but when the congress opened in St. Louis in August 1904, every detail had been arranged and the success of the venture assured, thus carrying to completion the work of the greatest dental congress ever held. The congress was unfortunate in the selection of the building in which the several sessions were held, but this, however, was not the fault of the committee of organization, for the latter had to adapt its plans to what the Exposition managers freely offered.

Organization and Co-operation of Dental Society Work. Many dental societies fall into ruts, through their officers following in the grooves of their predecessors, their meetings being but insufficiently advertised. It is not what your ancestors have done before you, but what you can and ought to do to enhance your position in life and that of the society you represent. During the past three years the Massachusetts Dental Society has sent out blank applications, postal cards, and programs inviting all ethical dentists of the state to become members. In this way the society has increased two hundred and fifty per cent.—and in the past ten years, four hundred per cent.

If all the state societies could get together in conclave to see what could be accomplished for the enhancement of the work of the National, I venture to predict that this association would increase in membership thirty-fold in a very short time. What an influence it could wield with twenty thousand members on its rolls!

Reciprocity, or Interstate Dental Licenses. The laws of this land provide that no person shall be deprived of the right to earn his living in any state of this Union, yet we have upon the statute-books of nearly each and every state and territory, laws which do precisely that thing. For instance, a dentist in failing health is ordered to a healthier and warmer climate, if he desires to live and regain his health; his financial circumstances are poor, he is a registered dentist in the state where he resides, but having been in practice many years, and on account of his health is not physically able to undertake examination in another state; he is, however, obliged to practice wherever he goes to provide for himself and family. In one state he has been declared competent to practice. Why should he be deprived of the same right in every state of this Union without further examination, provided he pays the license fee? It is logical that if the board in the first instance does its duty by qualifying him for practice in one state of the Union, he should be qualified to practice wherever he chooses without further examination. Where, then, is

the justice in subjecting him to a second test? It is evident that the time has come when dental laws in all states should be revised so as to be more in harmony with each other and for the ultimate purpose of interstate reciprocity.

If general reciprocity cannot be obtained, then stronger efforts should be made to bring about interstate reciprocity similar to what has recently been accomplished between the states of New York, New Jersey, and Pennsylvania. It would be well for such states to secure reciprocity with the state or states bounding it, and then the boards, if obliged to carry out the letter of the law, should be lenient on those holding licenses in a distant state. Let this matter come in some manner before this association for action or recommendation.

The Dental Degree. Considerable criticism, some of it harsh and ungenerous, in the past, resulted from the introduction of a new degree in place of the old D.D.S. (I am quoting from one who had much to do with its introduction.) It was not thought best at that period to explain the reason for the change. These reasons, however, were very simple. It was the original expectation of the faculty of that institution to confer the old degree. The writing of a diploma was committed to a professor, the head of the Latin department. Upon investigation it was found that a degree had never been conferred upon dentists by a classical institution.

From a classical standpoint the question was thus a new one. It was also found that the dental college which had originated the degree of D.D.S. (the Baltimore College of Dental Surgery) had written its diploma in Latin, and the degree which it had always given was "Chirurgiæ Dentium Doctor," the proper initials of which would give a C instead of an S with the two D's. It was first proposed to make the degree "Scientiæ Dentium Doctor," so that the initials would remain unchanged, but this would be liable to the same charge of being a new degree; and, moreover, dentistry was not properly a science.

It was decided, finally, to qualify the old degree of "Medicinæ Doctor" by the prefix "Dentariæ," and thus at the same time meet the classical requirements and give what seemed a proper and distinctive title. There was no thought of the faculty of the institution originating the degree arrogating to themselves any special superiority or claim of exclusiveness. Further, it was expected that the new degree would approve itself to other universities which might have dental departments, and thus gradually become the accepted degree. That such has not been the universal result is no fault of the originating university. The degree was recommended by vote of the faculty on February 16, 1869, and on February 27th the corporation established this degree.

Since then several colleges have adopted it or changed from the old to the new. Among these institutions are found the San Francisco Dental College and Tufts Dental College. May it not be well for this association to take up this matter of degrees and recommend the adoption of the same in all the dental institutions of this country?—thus unifying all and promoting harmony.

Life Membership. Would it not be well to establish a life membership fund of say twenty-five dollars or upward, the fund to be safely invested and the in-

come to be used for any wise purpose at the discretion of the association? This would make a more stable orgauization, another means of securing a permanent fund, and another method of increasing membership that might prove of greater benefit than we now anticipate. With a membership of 645, each of you can readily figure a goodly sum for investment, even if all did not desire life membership. This would eliminate the question of dues to those who do not care to pay yearly and who often allow them to lapse from neglect or otherwise, but who would be glad to remain members with this item forever banished.

The interest on the sum invested would be of assistance to the benevolent fund heretofore mentioned, or to the publication of the journal, or for other useful purposes which the association desired to promote.

Identification by the Teeth. Much has appeared in the journals on identification of the teeth of missing relatives and friends when found after death from disaster. Without going into this matter at length, I suggest that the Committee on Oral Hygiene again take the subject in hand.

Confliction of Dates of State Meetings. The dental journals have recently contained much in relation to conflict of dates in state meetings. I would also suggest, if feasible, that the Committee on State and Local Societies give this subject attention to see what can be done to remedy this confliction. I realize that this is a matter of great magnitude, however, but something may be accomplished in this line if the committee will put energy into the work.

The British Dental Association extended an invitation to meet with them in Southport, England, May 20 to 23, 1905. This invitation was, on behalf of this association, accepted in a suitable letter by your president, and six delegates were appointed in due course to represent this organization.

In closing I desire to express my appreciation to the several section and clinic officers, and all others who have contributed to the success of this ninth annual meeting, and my hearty congratulations for the splendid support and enthusiasm given me in the preparation of the program, together with their uniform courtesy and expression of goodwill toward the writer during our official relations.

[FROM SECTION III: READ IN GENERAL SESSION.]

Three Years' Service in the Philippines.

By ROBERT T. OLIVER.

THE creation of the Army Dental Corps by act of Congress, February 2, 1901, the organization of its board of examiners, the duties of said board in Washington, and the subsequent history of the corps, are too well known to necessitate further information of a general character. Therefore, I shall confine myself to a brief *résumé* of the history of that portion of the corps who saw pioneer service during its first foreign tour of three years in the Philippine Islands.

You will remember that one of the provisions of the act creating the corps was to the effect that those members of the Hospital Corps, U. S. army, who were graduates of dentistry and had been detailed as dentists for at least one year prior to the passage of the act were to be admitted to the corps without examination. This provision gave us five men almost from the start, they being located in the Philippine Islands. As the bulk of our army (over sixty thousand men) were at that time on duty in the Philippine Islands, it became very apparent early in our career that the majority of our successful candidates would have to proceed to the islands for duty by their first order. This proved to be the case, and our first eleven candidates were ordered to report to the commanding general, division of the Philippines, for assignment to duty, which gave us sixteen men in the then active territorial division of the army where their services were most needed.

Early in June 1901, in consultation with the Surgeon-general, who was then about to leave Washington for a four months' tour of inspection, he stated that he supposed our board would finish its services as examiners of candidates, and that the entire prescribed quota of thirty dental surgeons would be filled by August 1st, and that he proposed leaving instructions for the disposition of our board on that date, and desired to know where we should like to be stationed. Knowing that the larger part of our corps would be in the Philippine Islands, and believing that the real business of actual supervising would occur in that division, then in a state of war, where a corps organization of dental surgeons would be an absolute necessity, I happily chose Manila, and was complimented by him on the selection. And here, gentlemen, let me digress long enough to say that never have I felt a pang of regret for having selected

that duty, for I have had the pleasure and honor of serving at the head of a little band of the most loyal, hard-working, diligent, and conscientious young men of our profession that ever in the world's history worked together for the good of the service and the glory of their profession. Words fail me to express my appreciation of their sterling worth as men and as dental surgeons.

When my order was issued August 1st to proceed to Manila, I was ready and eager for it. In making my last call upon the Acting Surgeon-general prior to my departure from Washington, I was informed that I would be expected "to organize and maintain the corps upon a good working basis to the needs of the division, then in a state of war."

This simple instruction was not fully realized until October 16th, the date on which I reported for duty in the office of the chief surgeon of the division, Manila, P. I., and found from the mass of official correspondence awaiting me and the chaotic state of existing conditions that my duties as defined by the Acting Surgeon-general were to be, for a while at least, of tremendous magnitude. My reception by all officers at division headquarters was very cordial, especially so by the medical officers, who proffered every assistance possible to the furtherance of my desires in the matter of organization.

Upon arrival I found that of the sixteen dental surgeons in the islands, only ten had the necessary outfits, and these only partially complete. The five who were appointed from the Hospital Corps were still using their personal outfits, more or less complete, and one recent arrival was doing his best at a small station in Laguna province with the small dental case furnished to the medical department.

All these men were stationed at various towns throughout the provinces then under American occupation, and on account of the large number of troops demanding their attention it had become necessary to change them from time to time to different stations and localities, so as to better meet the requirements for dental treatment. I was surprised to find that before my arrival more was demanded of dental surgeons than could possibly be accomplished by them. They had often been sent to one- or even two-company posts with instructions to complete all dental work necessary there in from five to ten days' time—an utter impossibility. It therefore became necessary to divide the number of dental surgeons and send a sufficient number to the different brigades *pro rata* to the strength of those brigades, and request orders directing them to remain at stations a sufficient length of time to accomplish some good in the way of tooth-conservation, as well as relief from pain, which we termed "emergency treatment."

At this time the division of the Philippines was divided into the department of North Philippines, containing the 1st, 2d, 3d, and 4th brigades; and the department of South Philippines, containing the 5th, 6th, and 7th brigades. The new assignments requested were as follows: *Department of North Philippines*—1st brigade, 3 dental surgeons; 2d brigade, 2 dental surgeons; 3d brigade, 3 dental surgeons; 4th brigade, 2 dental surgeons. *Department of South Philippines*—5th brigade, 2 dental surgeons; 6th brigade, 1 dental surgeon; 7th brigade, 2 dental surgeons; with two including myself, in the city of Manila.

There being an active state of insurrection in the islands, it was necessary for the army to be distributed to a vast number of small stations throughout the ar-

chipelago, and while it was not the endeavor to send . dental surgeon to each and every station, it was, as far as practicable, determined to send one to each important station of the territory, where he would be located for periods of time averaging about two weeks, during which time he operated for all cases requiring his services and received dental patients from adjacent smaller commands. This itinerant service of dental surgeons was carried out during the entire three years of my service in the Philippine Islands for the reason stated at the time it was inaugurated, in the fall of 1901, to wit: "That the greatest benefit to the greatest number could be accomplished by sending dental surgeons to stations throughout the departments, instead of having patients sent to the dental surgeon at some centrally located station of his territory."

The original plan, however, was modified to a certain extent by division orders issued the first of the year 1903, which directed dental surgeons to visit only a certain number of the large stations throughout the territory assigned them, creating sub-stations of the smaller commands and requiring dental patients to be sent to the dental surgeon at his nearest regular station, in charge of a noncommissioned officer, on such dates as may have been previously arranged for between the dental surgeon and the commanding officer. This plan resulted in very material benefit to all concerned, and gave greater time for dental surgeons to practice a more conservative treatment, eliminating the loss of time necessary to the packing, repacking, and unpacking of outfits awaiting and during transportation, as shown by previous records, when all stations were visited. All dental surgeons except those on duty at base stations made itineraries throughout their respective departments.

After the declaration of peace, July 4, 1902, the policy of the army was to largely decrease the number of stations throughout the islands, which of course made it somewhat easier for the dental surgeons of the several departments. And while we had one hundred and forty-odd stations to be visited by the sixteen dental surgeons when first I arrived in the Philippines, or until July 1902, the number was so decreased that there were less than fifty to be visited at the time of my departure in October 1904.

TRANSPORTATION FACILITIES.

The transportation of dental surgeons with their assistants and complete portable outfits was an important factor for consideration in the division at all times, and it frequently became necessary to take steps to insure safety from molestation by marauding bands of *insurrectos.* In the early days it was not uncommon for the dental surgeon with his assistant and outfit to travel among the various stations of his itinerary in the mountain districts per pack-train, with an escort of armed men for protection, and on many occasions it has been necessary for them to travel from one station to another between different islands aboard native sailing *praos,* those peculiar, rough-hewn, knife-blade-shaped canoes with the large picturesque bamboo outriggers. Later on, transportation became safe by escort or light quartermaster wagon, and sometimes, when available, by the Manila and Dagupan Railroad, with the very frequent use of chartered inter-island transports of the army.

FIELD EQUIPMENT.

The portable outfit comprising our field equipment is very compact, complete, and admirably adapted for the peculiar character of service required in the Philippines. This outfit is capable of being packed in four chests and two crates; one crate containing the take-down chair and its equipment; one chest, "Dental instrument chest No. 1," containing all operating dental instruments and appliances, each placed in a separate compartment in the trays of the chest, made especially to fit it, to prevent rattling in transportation. The second chest, designated "Dental instrument chest No. 2," contained the various articles of supplies; and the "Dental engine chest," for the engine and its equipment. The contents of these chests embrace everything essential to a first-class practice of field operative dentistry.

DENTAL BASE STATIONS.

It soon became apparent that other treatment than operative would be necessary, and as it was absolutely impracticable to attempt to carry a laboratory outfit sufficient to attempt prosthetic operations, I formulated a plan, which was approved by the chief surgeon of the division, of creating what I was pleased to term "base stations," which were to be placed in charge of the most competent dental surgeons and equipped with complete laboratory outfits, so that all prosthetic cases resulting from a soldier's loss of teeth in the line of duty could be handled at these stations in addition to the operative cases of the locality.

The first one, "Dental base station No. 1," was opened at the First Reserve Hospital, Manila, P. I., early in March 1902. It was contemplated that all prosthetic cases occurring throughout the department of North Philippines would be transferred to this station for necessary treatment. Another, designated "Dental base station No. 2" was at the headquarters of the department of South Philippines, in Cebu, and was supposed to attend to all prosthetic cases of its respective department. Later on, when the reorganization of the division in October 1902 provided for three departments, viz, department of Luzon, department of the Visayas, and department of Mindanao, the dental base station No. 2, heretofore located at Cebu, was transferred to Iloilo, the headquarters of the new department of the Visayas; and another new one, "Dental base station No. 3," was opened at Zamboanga for the department of Mindanao. It was also contemplated that at dental base station No. 1 the oral surgical cases coming within the jurisdiction of all department dental surgeons were to receive necessary operation or treatment, and instructions were sent to dental surgeons throughout the archipelago to have all such cases transferred to Manila for said purpose.

OFFICE ACCOMMODATIONS.

As a rule, dental surgeons were given the best room available for their operations at the various stations of their itinerary. Usually this has been part of a hospital, although it had not been uncommon for rooms to have been assigned for this purpose at the offices of quartermasters, or even commanding officers, where better operating light was available. In the early days, however, dental surgeons making the various stations throughout the active area of operations have been compelled to locate their offices in the various churches and monasteries of the small towns, and often in *nipa*

Exterior view of office at Cebu, May 1902.

Interior view of office at Zamboanga, Mindanao, May 1902.

shacks, closely adjacent to the hospitals or guardhouses for protection. On the islands of Samar, Luzon, and Mindanao, where troops have been encamped in the field distant from towns, dental surgeons have frequently been compelled to use tents for office purposes. While much good was derived by the commands from emergency treatment received at these offices under canvas, it was clearly demonstrated that a tent was a very poor and unsatisfactory place for dental operations —first, on account of the difficulty in securing proper light, which was either a too direct sunlight and consequently very hot, or else was diffused from the top canvas and cast false shadows in the oral cavity. It was also found impossible to keep the delicate instruments from rusting, on account of the moisture arising from the ground, as well as that which beat through the roof during tropical downpours.

At home stations it was frequently the rule to assign a house to the dental surgeon large enough to be used as an office and for living quarters. This plan proved very satisfactory when carried out, but unfortunately less than twenty-five per cent. of commanding officers conformed to it. At Camp McGrath, near Batangas, Batangas province, where two squadrons of the 12th Cavalry were stationed, the commanding officer had a building specially constructed for a dental office from plans submitted by the dental surgeon then on duty there. This exemplary action of the regimental commander was greatly appreciated by the corps, and it was hoped it might establish a precedent that would result in the same action being taken at other important large stations in the Philippine division. In the spring of 1903 a letter was written to the adjutant-general of the divisicn recommending "that adequate provision be made for the construction of suitable offices and operating rooms for the use of dental surgeons at each army post then building or under contemplated construction in the Philippine division, early advantage thus to be taken in securing ample space, a north operating light, convenient laboratory, supply lockers, etc." Nothing official was ever heard of this communication, however; consequently no action, as far as known, has ever been taken toward providing suitable offices for dental surgeons, except as above indicated at Batangas.

SUPPLY STOCK.

One of the first important things that was found necessary after arrival at Manila was to secure a full and adequate stock of dental instruments and supplies from which dental surgeons could replenish when necessary. This was accomplished in time, and a large storeroom set aside in the Manila medical supply depot for this purpose. Upon arrival of the first large consignment of stock, it was carefully placed upon perfectly dry shelves in a well-ventilated storeroom, and no doubt when placed there was in good condition, but after a few weeks it was observed that a tropical climate demanded new things in the way of preservation of instruments than any to which we had ever before been accustomed. Such delicate instruments as root-canal cleansers, broaches, drills, explorers, separating files, Kaeber saw-blades, flexible probes, burs, etc., were found to be so corroded with rust as in many cases to be unserviceable; and the larger operating instruments were also found to be in bad condition from the same cause. The Surgeon-general was advised of the peculiar destructive effect of the climate upon

these instruments, and it was recommended that the various supply dealers throughout the country who furnished instruments for our corps be directed to wrap all larger instruments in wax paper carefully twisted at each end, and to take such care of the smaller instruments by dipping in wax or rolling in albolene and corking in small sealed phials as was deemed necessary. After this, very little trouble was experienced in the care of instruments comprising the dental supply stock of the division.

ASSIGNMENTS.

The assignment of dental surgeons to duty, and the entire management of the corps in the Philippine division, was controlled by the supervising dental surgeon under the direction of the chief surgeon of the division until August 9, 1903, when during his absence on sick leave in Japan at that time, general orders from the division of the Philippines were published, directing that dental surgeons then on duty in several departments should report by letter to the commanding generals of the respective departments for assignment to duty. This inaugurated a change in the control of dental surgeons, reverting to the chief surgeons of departments, which did not at first produce beneficial results on account of the unfamiliarity of medical officers with the technicalities of this particular branch of the service. Their errors of judgment in regard to length of time required for dental treatment of commands at various stations, the character of treatment necessary, and the many other things depended upon a technical knowledge of dental surgery, were early manifested, and, although subsequently corrected as soon as understood, it must be stated that the character of our corps service was not maintained at the standard previously prescribed, as there seemed to be an idea prevailing with chief surgeons of departments to eliminate as much as possible the lengthy treatment of teeth often necessary to save them, as well as the insertion of fillings of a permanent character.

This plan was advocated, no doubt, in order that the dental surgeons could give some emergency service at a larger number of stations, and then proceed in all haste to the next station to continue the same unsatisfactory methods. In this connection it seems pertinent to quote the following from a letter of instruction sent by the chief surgeon of a department to all dental surgeons of his department, under date of August 22, 1903, to wit:

> In view of the large amount of dental work needed in the departments and the limited number of dental surgeons, it is necessary that their operations be expedited as much as possible. It is therefore directed that none but emergency work be done at the several stations; protracted treatment with the hope of ultimately saving a tooth being considered one of the main causes of delay in dental work.

This instruction given to the dental surgeons on duty in that department was not consistent with the main object of the creation of the dental corps, and certainly was in contradiction to instructions issued by the supervising dental surgeon eight months previously, under date of January 14, 1903, as follows:

> Since the great reduction and concentration of troops in this division due to the reorganization, it is contemplated that increased length of time at stations will give greater opportunities for tooth-conservation, permitting more extended treatment in cases of pyorrhea alveolaris, dento-alveolar abscess, putrescent root-canals, chronic pulpitis, perice-

Exterior view of office at Zamboanga, Mindanao, May 1902.

Interior view of office at Iloilo, Panay, June 1902.

mentitis, gingivitis, etc., and for permanent filling of all morsal surface cavities and cavities compounding morsal surfaces (in bicuspid and molar teeth) with metal, and the filling of incisor and canine teeth with gold when the consent of the patient permits. It is desired that hereafter efforts be made to finish all dental treatment required in the mouth of each patient, and it is recommended that all emergency cases be taken early each day in order that sufficient time can thus be obtained, later, to give operative cases the required attention.

It will be observed that the tenor of the two letters was diametrically opposed, and it can be imagined with what confusion this department chief surgeon's instruction was received by the dental surgeons on duty in that department, who had previously been instructed from a professional standpoint, as already related. This condition of affairs governing the dental treatment of the division continued for about three months, when the error became so apparent that the above-quoted instructions were of necessity modified, and it was finally arranged that in all matters having a professional bearing or requiring a technical knowledge the instructions should be issued by the supervising dental surgeon, leaving the assignments, per official orders, still in the hands of the department chief surgeons.

CHARACTER OF SERVICE.

The general efficiency of the corps service was highly appreciated and satisfactory to all concerned. The value of their services in relieving acute suffering for the thousands of men treated, the preservation of the vast number of teeth, the restoration of mouths to a healthy condition and the consequent return of patients to a fit condition for martial duty, is a great factor that should not be overlooked when considering the matter of a permanent and adequate organization of the corps in the regular establishment of the army. The numbers of men whose efficiency as soldiers has been materially benefited by prophylactic treatment, and the maintenance of a hygienic condition of the oral cavity, incidentally improving the entire digestive tract, have been well worth the total expense of the corps. Many cases of gastro-intestinal disease which for greater or less periods of time have been augmented by the ingestion of pyogenic bacteria have been benefited by the elimination of diseased oral conditions. Many oral surgical cases, such as fractured jaws, necrosis of bone, caries of bone, impacted third molars, empyema of the maxillary sinus, ranula, ex-section of nerve trunks, ex-section of jaws, etc., have also been treated in the division. These operations, coming within the jurisdiction of our specialists, have been greatly appreciated by all medical officers who have been fortunate enough to observe them. Of all oral surgical operations performed at dental base station No. 1, Manila, there have resulted one hundred per cent. of cures.

When it is considered that the effective service of the medical department of the army has been so greatly augmented and increased by the addition of a corps of specialists in dental and oral surgery, who have undoubtedly furnished additional luster to the glory already attained by that important department, it would seem that, in appreciation of such service, every effort should be made by the medical and dental professions of the country, as well as the army itself, to incorporate this corps of specialists into said department upon such a permanent basis as to encourage and stimulate the corps to its greatest efficiency, thereby giving the professional efficiency of the medical

department of the United States army a greater scope in its health-saving duties than ever heretofore.

Originally it was not contemplated to render any service for native troops; in fact, those valuable adjuncts of the army, the Philippine scouts, seemed to have been lost sight of entirely as far as the dental corps was concerned. It was only a matter of six months, however, till it was manifestly apparent that some service of a dental character must be given them. Owing to the small number of dental surgeons on duty in the islands at that time, it was considered inexpedient to extend dental service to the Philippine scouts except that actually necessary for the alleviation of pain, to wit extraction of teeth, medicinal treatment of teeth, lancing of abscesses, etc., and this only at such stations visited by the dental surgeon as contained native in addition to American troops, or at such sub-stations immediately adjacent to a post regularly visited by a dental surgeon. During the last year, however, the demands for dental treatment by the native troops, which numbered approximately five thousand, have steadily increased, which tends to show the marvelous effects of higher attainments in education, as well as their general aptness in following the later ideas of civilization brought over by the Americans. In a few instances, however, notably those stationed at Caloocan, a suburban city of Manila, native troops have been given a more conservative treatment by the dental surgeons located in Manila.

The kind of treatment rendered for officers may be said to differ materially from that usually rendered for the enlisted men of the army in this respect. Due consideration has been given to the fact that officers are permanent members of the army to whom it was essential they should receive the most permanent and conservative treatment—gold fillings, crowns, bridge work, etc.—whereas the enlisted men largely are only temporary units of the army whose services can only be counted on for a period of three years, or during their first enlistment, statistics showing that the majority of the enlisted *personnel* of the army only remain during one enlistment.

At the larger posts throughout the division, where dental surgeons had opportunities for operating a considerable period of time, the character of dental service was based upon the standpoint of our greatest professional efficiency—*i.e.* tooth-conservation; but at the smaller stations, where the dental surgeon was located for a short period of time, it was of necessity based upon emergency treatment, in order that the greatest number of men could obtain the benefits of dental treatment during the limited period. This unfortunate condition of affairs is more or less to be regretted, as it is considered only fair that every soldier should have equal opportunity of having his teeth filled and saved, especially when he is detailed for duty at remote stations in the Philippine Islands, where it is absolutely impossible to obtain dental treatment from civilian dentists, even at his own expense.

That our corps has filled a long-felt want and has come to stay is the expression of almost all officers who have had opportunities of considering its great work in the Philippine Islands.

The following extract, taken from the chief surgeon's annual report, dated Manila, P. I., June 30, 1904, tends to indicate what this high-ranking medical officer thinks of the services performed by the dental surgeons during the year:

Dental offices under canvas at Camp Weyler, Samar, April 1902.

At Camp Stotsenberg, Luzon, June 1903.

The services performed by the contract dental surgeons on duty in the division have unquestionably benefited the general health and comfort of the commands. Climatic conditions are more conducive to the inception of oral diseases, especially to the inroads of dental caries, than is the case in the United States. The work accomplished is restricted by the long distances to be traversed, by the limited number of dental surgeons, and the time lost in making change of stations. The larger posts are well attended to, but the smaller stations suffer somewhat. The relatively short periods available for staying at each station in the itinerary have in many cases rendered conservative operations impracticable and confined all dental work to emergency treatment.

It is very hard for one unfamiliar with the amount of service rendered during our tour in the Philippines to appreciate the wholesome amount of good our corps has accomplished, unless the matter is put directly to them from a professional standpoint, with kinds of cases and numbers of each presented and operated upon. It is therefore with feelings of justifiable pride that I invite your attention to the following table representing the total number of cases presented and operations performed by our corps in the Philippine Islands during my service there. The results obtained therein are an honor to our noble profession, as they certainly create the world's record of dental service, for never before has there been an equal number of dental surgeons banded together in one organization working toward a common end.

SERVICES RENDERED.

Cases presented.

Abrasion, mechanical	87
Abscesses of the jaws	91
Bridges, defective	19
Calcification of the pulp	10
Caries of the alveolar process	4
" " " jaw	1
" " " teeth	55,567
Crowns, defective	12
Cysts of jaws	11
Dento-alveolar abscess	3,733
Dentures, broken	17
Devitalized pulp	395
Edentulous jaws	32
" jaw (partial)	284
Empyema of the antrum	36
Erosion, chemical	64
Eruption, painful	11
Fillings, defective	143
Fracture of the alveolar process	2
" " " jaws	40
" " " teeth	212
Gangrene of the gums	1
Gingivitis, acute	636
" ulcerative	16
Hemorrhage (secondary), following extraction	22
Hypertrophy of the gums	105
" " " pulp	39
Hypercementosis	46
Impacted teeth	47
Mal-eruption	3
Necrosis of the alveolar process	12
" " " jaws	39
" " " teeth	1,262
Neuralgia (trifacial)	29
Odontalgia	16
Orthodontia	42
Ostitis	1
Periostitis	17
Pericementitis, acute	481
" chronic	431
Pulpitis, acute	3,811
" chronic	2,168
Pulp-nodules	2
Putrescent pulp	287
" root-canals	225
Ptyalism, mercurial	3
Pyorrhea alveolaris	663
Recession of the gums	20
Resorption of the alveolar process	82
" " " gums	1
Retarded eruption	6
Salivary deposits	6,454
Sensitive dentin	60
Stomatitis, acute	83
" syphilitic	2
" ulcerative	56

Sub-periosteal abscess	1
Supernumerary teeth	7
Trismus	1
Tumors of the gums	3
Minor miscellaneous cases	631
Total	78,587

Operations performed.

Abscesses lanced	360
Amputation of roots	5
Bridges	194
Bridges reset	45
Calculus removed	6,464
Cauterization	7
Crowns	1,055
" reset	35
Dentures, full	37
" partial	286
" repaired	25
Defective crowns removed	1
Dentures, teeth reset	6
Exsection of the jaw	1
Exsection of nerve trunk	1
Fillings, amalgam	21,816
" combination	1,034
" defective, removed	46
" gold	4,211
" gutta-percha	2,220
" oxyphosphate	11,692
" tin	42
Gums excised	45
Local treatment (gums)	172
Operations for empyema	8
" " ranula	1
" " reduction of fracture	22
" " trismus	1
Pulp devitalized	4,036
" extirpated	3,493
Root-canals filled	4,049
Surgical removal of necrosed bone	1
" " " " process	1
Surgical treatment for stomatitis	7
Teeth extracted	12,844
" treated	7,991
Treatment of fractured jaws	17
Minor miscellaneous operations	290
Tooth replanted	1
Total	82,562

Aggregates.

Grand total—Cases presented	78,587
" " Operations performed	82,562
" " Patients treated	30,262

ORAL CONDITIONS.

Judging from the kind of cases first presented it could be easily seen that the vast majority of soldiers had never known what dental attention was, as the neglected condition of their mouths and teeth indicated beyond all doubt that the individual had paid very little or no attention to the welfare of these important organs. When we consider that there were probably sixty thousand troops in the Philippines at that time, a majority of whom had been on duty in the tropics for about two years with no possibility at hand of obtaining dental treatment from civilians or otherwise, and with the manifold effects of the tropics, character of food, and continuous active service against a wary foe, which prevented even the ordinary care to their personal toilet, it can be imagined what condition the mouths of these men presented.

It was soon found that between eighty and ninety per cent. of the commands required dental attention, that few of the men ever made an attempt to clean their teeth, that probably twenty per cent. did make an effort, when in permanent camp or barracks, and that the great majority of those who came to the dental surgeon were found to be habitually affected with one or more of the following conditions and frequently a combination of several: Very foul breath, dark reddish brown stain on the teeth, thick salivary calculus with turgid congested gums, an acute or chronic gingivitis, marked recession of gums, some form of stomatitis, pyorrhea alveolaris, and frequently exaggerated conditions of caries and pulpitis, often accompanied by acute odontalgia.

The need for dental treatment was especially noted as being greater for those

men recently returned from active campaigning in the field. There are many reasons incident to active service, such as lack of opportunity, scant water supply, entire time filled with martial duties, constant alertness for the enemy and in self-preservation, with the loss of inclination to appear anything but the real fighting machine which rendered it almost impossible for a soldier to give even the ordinary care to his person, much less any hygienic attention to his mouth or teeth.

This neglect, often accompanied by the direct local effects and indirect systemic effects of poorly cooked food upon the oral tissues, together with a general loss of tone due to fatigue and the rigorous tropical climate, were prominent etiologic factors in the foregoing pathological conditions mentioned.

Of all the cases that came under observation of dental surgeons during our three years' tour, it is a noteworthy fact that not a single case of true scurvy was discovered, which speaks volumes in behalf of the excellence of the field rations furnished by our government.

In this connection I may say that the oft-quoted statement of the terrible tropical effects upon the teeth and gums is a mistake, as tropical effects are only incidental and can be traced to a general loss of tone in the individual and the consequent lessening of nutritive activity. One of the most common indications of this effect on soldiers who have been on duty in the tropics for periods of time over one year is demonstrated in the capping of pulps, a procedure which now, since experience has taught us, is never attempted with any assurance of success for officers and men of the army who are undergoing the arduous duties incident to their occupation.

EXAMINATIONS.

During my three years' tour of duty in Manila there have only been three classes of candidates ordered to report for examination, of which number none qualified; the cause of these failures apparently being that the candidates in all cases had been away from their text-books for a considerable length of time, some of them occupied with other duties than those of a professional character, consequently their opportunities for a thorough review were almost an impossibility.

PERSONAL SERVICE.

Upon reporting on October 16, 1901, the writer was directed by division orders to report for duty in the office of the chief surgeon of the division as executive officer of the dental corps, in which position he continued in the uninterrupted performance of such duties until March 1902, when dental base station No. 1, First Reserve Hospital, Manila, P. I., was opened. He was then directed to take command of same in addition to his other duties, which necessitated his presence at the base station for about two hours each morning, directing and supervising the operations of the three dental surgeons on duty there, and commanding the detachment of Hospital Corps men detailed as assistants and clerks to the dental surgeons there stationed.

PROFESSIONAL OBSERVATIONS.

In addition to service directly connected with the Army Dental Corps, it has been my privilege to observe many other things from a professional standpoint that no doubt will be of interest to you. It was noticed early that great numbers of the natives throughout the islands are confirmed *buyo* or betel-nut

chewers. This is undoubtedly the most filthy and disgusting habit I have ever seen. The frequent expectoration is bad enough, but when we consider that the expectorated matter is of a deep red color, about the color and consistence of ox-blood, and that the natives are not experts in expectorating, allowing it to flow down over their chins and often on their clothing, its disgusting effect can be readily imagined. Buyo is nothing more than a thin cross section of the betel-nut, which in section looks similar to a section of a small lemon. On this slice of betel-nut they sprinkle a plentiful supply of lime, then skilfully roll the entire mass in a long narrow green leaf similar in appearance to the peach leaf. This is then introduced into the mouth and usually kept stationary on one side along the buccal surfaces of the molars, and is pressed from time to time to extract the juice. The appearance of a buyo-chewer's teeth is peculiar to itself, the teeth look as if slightly coated with dark red lacquer; all concretions of tartar also having the dark red stain. The gums usually are tumefied and often separated from the teeth, frequently presenting the loosened condition following mercurial ptyalism. It took me quite a while to finally settle in my mind just what the odor of a buyo-chewer's breath resembled, but I finally fixed upon it as being identical in odor to that of partially consumed acetylene gas.

Many tribes of Filipinos have remarkable ideas about personal adornment and teeth-decoration. Some of the Tagalos in Manila go to native dentists and have what are termed "dental ornaments" placed between their front teeth. These are usually small appliances made very similar to the ordinary paper fastener, except that they are made of gold, with a circular piece in front terminating in two long tangs behind, which lie very closely together to facilitate insertion between the incisors. The tangs are then opened laterally upon the lingual surface, so as to hold the ornaments in position.

The Iggorote and Negrito tribes of northwestern Luzon take special delight in filing their front teeth to a point. This is done by files to begin with, if they can be found, afterward using a small square section of stone to wear away the enamel and dentin. Teeth treated in this manner present a very peculiar appearance with nothing but single sharp pointed cusps left where the broad incisal edges should be. Some of the southern tribes, particularly the Moros, have a way of staining their teeth black, and have adopted a very ingenuous method of causing the dark stain to "stay put." They begin with a rough stone, often the same one with which they sharpen their bolos and creeses, rubbing the labial surfaces of the centrals, laterals, and canines, both superior and inferior, until they have worn away the entire surface of the enamel and well into the dentin, leaving a concave labial surface to the tooth. They then begin their preparation of applying the stain, which is readily absorbed into the dentin to a greater or less extent, giving it a permanent dye. I have been informed that this dye is made as follows:

They first select a green cocoanut, about two-thirds ripe, and after removing the husk covering, carefully cut off the top cap portion, preserving the milk and unripe meat intact. They then take a mass of soft iron filings, about half a teacupful, and pour this into the cocoanut. The iron filings are acted upon apparently by acids of the milk in such a way as to greatly oxidize it after having been set aside for a matter of a week or ten days. When applied the liquid has evap-

orated to a rather thick inky consistence and has a very dark bronze color. The surfaces of the teeth are then dried and painted over with this liquid, using a small bamboo stick which has been chewed to a brush-end for this purpose. Many applications, covering a period of sometimes several days, are necessary before the final dark bronze-black is obtained, and frequent re-applications are necessary at intervals, to keep the desired shade.

PHILIPPINE DENTAL LAW.

During the fall of 1902 the Philippine Civil Commission took up for consideration the matter of a suitable law to regulate the practice of dentistry in the Philippine Islands. This matter had been taken up about the first of the year 1902 at the urgent request of several American dentists then practicing in the city of Manila, and was referred to a committee for investigation and report, but as no satisfactory report was ever received from the committee the matter was again taken up about the last of September 1902, which resulted in another investigating committee to which the Commissioner of Public Health was appointed as chairman. About the middle of October I was invited to meet the commissioner and the Secretary of the Interior for the Philippine Islands, for the purpose of consultation in regard to this bill and was asked to formulate a draft of what I considered necessary for a proper law regulating the practice of dentistry in the Philippine Islands. After carefully reviewing the laws of the states of Minnesota, Alabama, New York, and Indiana, and the peculiar local conditions, I drafted a bill which it was thought would meet the conditions existing. This was presented to the committee and after a thorough discussion the matter was referred to the Commission for consideration. I was invited later to meet several members of the Commission in consultation, with the result that the present law regulating the practice of dentistry in the Philippine Islands was framed, and as Act No. 593 came up for public consideration in December 1902, and again in January 1903, being enacted with modifications January 10, 1903.

Several days after the passage of the act, I was again invited to consult with the Commissioner of Public Health in regard to the appointment and organization of a board as provided for in the act. As there were three separate and distinct classes of dentists then practicing in the islands—(1) Dental surgeons of the United States army then on duty in the Philippine Islands; (2) American dentists then engaged in civil practice in the Philippine Islands; (3) native dentists —it was decided that a representation from each of these three classes would constitute a very fair and equitable board. Several days afterward I had the honor to receive an official notification from the Civil Commission stating that I had been appointed a member of the Board of Dental Examiners for the Philippine Islands, and that if accepting the appointment I would report at the office of the Commissioner of Public Health for the purpose of meeting the other two appointees to the board and effect a permanent organization. As per invitation, the following named dentists, Wallace G. Skidmore, D.D.S., Antonio Vergel de Dios, D.D.S., and the writer, met for the purpose of organization on February 17, 1903, which resulted as follows: Robert T. Oliver, nominated and elected president; Wallace G. Skidmore,

nominated and elected secretary; Antonio Vergel de Dios, member. Wallace G. Skidmore, D.D.S., American, age thirty-three, graduate of the dental department, University of Iowa, March 1892. Prior to 1898, he practiced dentistry in Minneapolis, Minnesota, and when the war with Spain was declared he enlisted in the famous Minnesota Regiment, went with it to the Philippine Islands and participated in many engagements of its arduous campaigns in 1898 and 1899. He obtained an honorable discharge from the army, opened a first-class American office, and began the practice of his chosen profession in 1899, being the first American dentist to locate in Manila after American occupation of the islands.

Dr. Skidmore resigned as secretary of the board and returned to the States in March 1904.

Abram P. Preston, D.D.S., age thirty-four, graduate of Kansas City Dental College, March 1895, was appointed to fill the vacancy on the board and was elected secretary in March 1904.

Antonio Vergel de Dios, D.D.S., Filipino, age fifty, graduate of the dental department, University of Madrid, Spain, and dental department, University of Pennsylvania, May 1893, also holds a French degree in dentistry from a school in Paris, France. Dr. Vergel is a quiet, affable, courteous, and cultured gentleman, typifying the highest class of Filipino practitioner. A man of broad conceptions, refined discrimination of justice, and suave demeanor, with whom it was a pleasure to serve.

One of the first things that engaged our attention was the preparation of suitable record books, registration book, registration certificates, receipt books, blank forms of letter heads, application blanks, etc. Inasmuch as three forms of certificates were necessary—viz., regular registration certificate, temporary certificate for those who were to be permitted to practice until the next regular meeting of the board, at which time they were to be examined, and the undergraduate's registration certificate, issued to that peculiar class of men who were graduates of the old Santo Tomas University in Manila with the degree of "Cirujano Ministrante"—it became necessary to give every consideration to the form and wording of these certificates. It was further decided that in order to avoid any possible mistake in the handling of funds or the issuance of certificates, and also that the business of the secretary could be controlled with a minimum amount of friction, to arrange the registration book, receipt book, and certificate book with stubs so that there would be five checks on each certificate of whatever class issued. This, of course, made it necessary to have separate sets of receipt books for each class of certificate, so that the number of the registration, of the certificate, and of the receipt, corresponded with the same number of the stubs in the respective books. While this method gave a great deal of thought in preparation, its value in minimizing the work of the secretary and in preventing errors was afterward greatly appreciated.

It was determined further that in case an individual lost his certificate, from any cause whatever, it would not be reissued except in duplicate, said duplicate to have the advanced chronological number. On account of the tremendous volume of work at hand, the Philippine Bureau of Printing was unable to finish the books of record and certificate forms until September 1903. The application blanks were given to us early and a copy

sent to each dentist in the islands. These applications were returned in due form and were kept on file pending further action, until the receipt of the books and certificate forms. On September 21st the issue of certificates began to the thirty dentists who had complied with the provisions of the law, namely, fifteen Americans and fifteen Filipinos, all of whom were registered without examination on account of the provisions in the act, which permitted all dentists who had been in practice prior to the date of the enactment to register without examination. Several native dentists who could not understand that any enactment had been made which compelled them to register or pay for a certificate were notified to appear for a hearing and present reasons why they failed to comply with the law. In all cases, these men were able to show a lack of understanding in the matter, and as the manifest intent of the law was to create no undue hardships to those already in practice who showed a spirit of compliance, they were permitted to register under the provisions of the act. One Englishman, not a graduate of dentistry, practicing in several of the provincial towns throughout northern Luzon, failed to pay any attention to communications from the board. He was finally ordered to appear in explanation of his conduct, when it was found that he had never attended a dental school or ever studied dentistry, but had acquired some crude knowledge of dental operations while acting as office-boy to an English dentist several years previous. He stated that he had only been attempting plastic fillings and gold shell crowns, which seemed to give satisfaction to the natives. After due consideration of this case the board informed him that it would be impossible for him to continue further practice, and advised him to leave the islands. It was learned subsequently that he sold what outfit he owned and entered into other business. Another Englishman was reported to the board on several occasions as having violated Section 9, in being guilty of unprofessional conduct. As that section provided that the board may revoke a certificate for unprofessional conduct, on due notice to the person interested and on hearing, subject to an appeal to the Board of Health, etc., it was realized that the board would be compelled to have an official interpretation or definition of "unprofessional conduct" so it could become a matter of record for the purpose of standardizing offenses against this section.

This matter was finally settled by recording the following definition of "unprofessional conduct" as official, and having it approved by the Commissioner of Public Health for the Philippine Islands:

1. Guilty of malpractice to the detriment of patient's health, well-being, or comfort;

2. Guilty of false representation as to character of services performed or materials used;

3. Guilty of indiscriminate destruction of teeth for personal commercial interests in disregard of the methods of professional conservatism;

4. Guilty of ignorant or unskilled treatment or operations upon the mouth, teeth or gums;

5. Guilty of total disregard of the ethics or the traditional gentlemanly deportment of professional men.

Examinations were held semi-annually, as provided by law. The first class, January 5, 1904, comprised the following three candidates:

Conrado Martell Arandes, Spanish; Felix Caleja y Urbina, and Apolinar Madamba, Filipinos. These examinations were conducted in Spanish, as it would have been an absolute impossibility for the candidates to have taken an examination in English. The board's papers were first prepared in English, then translated into Spanish by one of the officials of the Health Department. All the questions were answered in Spanish, which were afterward translated before they could be marked and graded. All of the candidates qualified: Dr. Conrado Martell Arandes for regular registration, and Drs. Urbina and Madamba for undergraduate registration as "Cirujano Ministrantes." The average percentage necessary for qualification was fixed at 70 for regular registration certificates, and at 60 for undergraduate certificates.

The second class, in July 1904, was composed of the following: W. A. Burch, American negro, graduate of dentistry; Nicholas Reyas Moscaira, Ensebio Castro, and Apolinio Rasal Santos y Concepcion, Filipinos. These candidates qualified—W. A. Burch, regular registration certificate, the three Filipinos undergraduate certificates as "Cirujano Ministrantes."

There was very little difficulty in enforcing the dental law, for the reason that most of the natives hastened to comply as soon as they were advised that such requirements were necessary. On several occasions native practitioners came in from outlying towns and distant provinces very much excited, they having heard that certain requirements were necessary for them to continue in practice. When they were at last quieted down and it was carefully explained what the requirements of the law were, they seemed very well satisfied and made efforts for immediate compliance. In two cases, however, there were apparent attempts to avoid complying with the law, and repeated communications from the board were disregarded. One of these practitioners living in Manila finally had orders served upon him to appear before the board for explanation, and presented himself in fear and trembling of what he imagined the consequences would be, as estimated from the old Spanish standpoint, which probably would have been confiscation of his entire dental outfit and incarceration in prison for a period ranging from six months to six years. His rather flimsy excuse was to the effect that his health had been bad and that immediately after receiving the first notice from the board he had been directed by his physician to live for several months in the mountainous district, about thirty miles from Manila, and since that time he had been closely following his physician's instructions. While his explanation did not exactly coincide with that gratuitously given by his wife, it was deemed expedient to permit him to comply with the law along the lines of least resistance, inasmuch as the law contemplated that all persons who had been practicing dentistry prior to its enactment should be permitted to continue their vocation. However, I may say that after a very severe reprimand and a strong manifestation of official indignation, he lost no time in following out the instructions of the board thereafter, incidentally acquainting other native dentists throughout the city and provinces with what they could expect if they failed to do exactly as they were instructed.

Perhaps an explanation of the degree of "Cirujano Ministrante" is in order,

and while my knowledge of Spanish and Spanish customs is somewhat limited, I will attempt to tell you something about this degree. The University of Santo Tomas has been located in Manila for over four hundred years, being older than any university in this country. Its instructors have invariably been selected from the ecclesiastical orders, and in years past as well as at present has been noted as having very capable and scientific men on its faculty. It has a medical course which is more or less complete as viewed from our standpoint of teaching and efficiency. Any student who completes the course in medicine at this institution and then finishes four months special study in dentistry (and I may say this instruction is extremely crude and embraces a very small amount of study from text-books more or less obsolete, with very little or no practical teaching), can be graduated as a "Cirujano Ministrante"—that is, administering surgeon, or practically assistant surgeon. The medical degree is termed "Cirugia Menor" or "Practicante," meaning in English a practitioner of minor surgery.

Only once did it become necessary to begin proceedings of prosecution in order to force anyone to comply with the law. This, I am ashamed to say, was with an American of more or less prominence in professional matters prior to his residence in the Philippine Islands.

Up to the time of my resignation as president of the board, which was handed in the day I sailed from Manila, October 15, 1904, we had 45 registrants upon our records, of which number 20 were Americans, 18 Filipinos, 5 Spanish, 1 Hungarian-American, and 1 Englishman, with the following classification: Graduates with the degree of Doctor of Dental Surgery, 18, including ten army dental surgeons; Cirujano Ministrantes, 18; no degree, 7; Cirujano Dentistas, 1; Cirugia Menor, 1. Of this number one was a Spanish woman, a Cirujano Ministrante, and one a Filipino woman, a nongraduate.

There was also one Chinese dentist, named Chen Aun, who up to the time of my departure was not registered. The board was still contemplating plans by which he could be examined and the matter was under delayed consideration.

MANILA DENTAL COLLEGE.

It will be remembered that at the annual meeting in 1901, at Milwaukee, the matter of granting special dispensation to the Manila Dental College came up for consideration. All the necessary forms required had been filled out and forwarded to the association at that meeting, accompanied by explanatory letters of the conditions existing in Manila, and it was only after lengthy discussion that the requested special dispensation was disapproved. Being in attendance at that meeting *en route* to Manila, I was personally requested by several of the prominent men of the association to investigate the affairs of the Manila Dental College and advise them of its standing and welfare. But being closely confined owing to official business after my arrival in Manila, I found it impossible to give this matter attention during the first two months. When I did get the time, however, I found that the Manila Dental College, as represented by statements and letters at the annual meeting, was a myth, and in reality existed only in the mind of its originator and on papers then on file with the association. In fact, all that could be found that might indicate the existence of such an institution was a sign, about six feet long and two

feet wide, which read "The Manila Dental College," the same being placed out of a window on the second story of an office building on the corner of the Escolta and Calle San Jacinto. Upon ascending the stairs and entering, I found a small office room, about fifteen by twenty feet in dimensions, with a desk in the center. This presented all the material evidences of this far-famed college. Further investigation revealed the fact that there had been a faculty composed of two American dentists, one being organizer, dean, president, and professor of operative dentistry; the other, professor of prosthetic dentistry, crown and bridge work, and, I believe, orthodontia; one native practitioner as demonstrator, and two army surgeons (Volunteers) whose services were employed when required, to lecture upon anatomy, physiology, oral surgery, materia medica, and therapeutics. I found, further, that two or three Hospital Corps men, and about the same number of Filipinos, had attended this institution for a period of a few months prior to my arrival; that they had attended the instruction given by the army surgeons in the branches taught by them; that said instruction was given either at one of the army hospitals or in the office of one of the two American dentists; that all instruction from a dental standpoint had been given in the offices of one or the other of these dentists and consisted mainly in what might be termed "clinics," the students being allowed to stand around the chair during the regular operating hours of these men, who gave instruction from time to time as the work at hand proceeded. In so far as the college having a separate building with the required square feet of floor space, suitable-sized infirmary, mechanical and chemical laboratories, lecture rooms, equipment, etc., there was nothing of the kind. It was one of the best things the association ever did, to discourage the special dispensation so urgently requested at that time, as such action effectually put a stop to what would apparently have been another blot upon our profession's fair escutcheon—the organization of a fake institution upon the diploma-mill basis—that would have created a low estimation of American dentistry in the minds of Filipinos and other orientals.

LEGISLATION.

It is believed that the time has arrived when provision should be made to reorganize the dental corps with commissioned status of three grades in the permanent establishment of the army. Such a reorganization could be effected with less than the present expense of the corps, which at the last appropriation figured $56,160 annually, and would result in untold benefits to the corps, as it would then be a means of attracting the very best professional talent from the better class of young practitioners. It would insure a future for its members by giving them rank and pay commensurate with the dignity of their profession and their status as professional men, and more nearly in proportion to the value of their service as specialists. It would be a stimulus for them to render their best service to the government, and would greatly assist in maintaining a high degree of efficiency and *esprit de corps,* would tend to elevate the official status, social standing, and self-respect of its members, give them a justifiable pride in the new specialty, and create a spirit of contentment and satisfaction in the individual membership of the corps, without which any organization has its limi-

tations of efficiency. The corps has enjoyed the reputation of having a notable degree of professional talent. This is largely due to the established high standard for qualification demanded by the examining board, and also to the class of professional men who were originally admitted to the corps, all of whom joined with the expectation of finally becoming a part of the permanent establishment of the army, obtaining thereby an assured and honorable position during active life with ample provision for the future.

The majority of dental surgeons who have been on duty in the division of the Philippines are beginning to manifest a spirit of unrest and discontent at the present contract status. If this is not changed it will result in the corps losing a large number of those desirable young men of highest qualifications who cannot afford to remain stationary in a position which does not hold other inducements for the future than a continuation of this status of inferiority. The results will then be that the only class of men who will be attracted by a contract status will be those of roving disposition who may care to see some of the world in traveling to and from our insular possessions—men who have no intention of staying in the service more than a year or two, with no inclination to make a study of military dental surgery for the betterment of the new specialty, or with any ideas of familiarizing themselves with the customs of the service or its voluminous record and paper work. It, therefore, devolves upon this association, the natural mother of our Army Dental Corps, to take up the matter of legislation for the betterment of its offspring and the just military recognition of our beloved profession.

You must know, first, that the army is a very peculiar organization, differing from anything else in our American institutions except the navy, in that its very inception and maintenance depend upon class distinction among individuals otherwise free, equal, and independent Americans. This class distinction is based upon different gradations of individuals, termed "rank"—and without rank an individual in the army loses his personality entirely, for, generally speaking, the army is composed either of enlisted men without rank or commissioned officers with rank. Therefore the person or class of persons belonging to the army and supposed to be an officer but without either a commission or rank is an official hybrid and somewhat similar to a man that has fallen overboard in mid-ocean, who struggles hard to keep his head above water as long as possible, but eventually goes down in despair.

The present status of the Army Dental Corps is without commission, without rank, without military status, and almost without social recognition, except what through strenuous efforts the individual dental surgeon maintains for himself by continual struggle. If the best professional possibilities are expected of our corps and our greatest efficiency made available for the army along the line of tooth-conservation and the maintenance of a hygienic condition of the mouths and teeth of its *personnel,* then something must be done to place it permanently in the regular establishment of the army upon a commissioned basis, as *bona fide* officers; for at present we are neither officer nor enlisted man, and yet are bound by the inflexible rules of life and discipline demanded of *bona fide* officers. We are something like the old expression "neither fish, flesh, nor fowl," and the continued existence of

our corps upon the same high plane as heretofore is sure to be of short duration.

The present status of the contract dental surgeon is continually a source of humiliation and degradation to all, and to those more sensitive men who have occupied social positions at their homes equal to the best in their several communities it is of course more keenly felt.

In the matter of uniform we are especially unfortunate—more so during the last two years than previously, on account of the fact that the present uniform prescribed for dental surgeons has no shoulder-strap with its indication of authority. We originally were permitted to wear the blue uniform with the shoulder-strap of a first lieutenant of the medical department, with the block letters "D. S." between the bars of the strap. Since this has been eliminated our blue uniforms are perfectly plain, with standing braid collar, having a silver caduceus and the block letters "D. S." thereon. To those unacquainted with the army there is nothing to indicate to what such an individual belongs —whether to some private corporation or whether he is only a liveried servant. The field uniform of olive drab is also without any indication of office, with the caduceus and letters "D. S." in bronze on the collar, and is the same on the cotton khaki used in the tropics. On the white uniforms the silver letters "D. S." and the caduceus adorn the collar, with no other marks. While wearing the service uniforms and cotton khaki with collar ornaments as described above, it is absolutely impossible to tell a dental surgeon from an enlisted man of the Hospital Corps at a distance of ten feet or more, as the enlisted men wear identically the same uniform (with the caduceus as a collar ornament), as dental surgeons—the only difference being that in place of the block letters "D. S." they wear the block letters "U. S." A distinction between these letters is impossible for the average person farther than ten to twelve feet. In fact, on several occasions in the office of chief surgeons of departments in the division of the Philippines, dental surgeons have been taken for Hospital Corps men and peremptorily ordered to report to hospital stewards for instructions, before the error was discovered. It seems a great injustice to educated professional men who have spent years in acquiring a technical and scientific knowledge of their specialty and who have qualified before a competent examining board before entering the service, to be so meanly uniformed as to be undistinguished from ordinary soldiers.

There is another thing in regard to lack of proper uniform that creates a hardship for the dental surgeon, and that is the discipline that must be exercised by him in the management of his particular line of business, for from time immemorial the enlisted *personnel* of armies have been taught to respect, obey, and look up to the wearers of shoulder-straps and to pay little or no attention to instructions or orders from other sources. Hence it often occurs that an enlisted man who perhaps may be the very pink of propriety in the presence of officers exhibits a tendency to question the instructions or orders given him by a dental surgeon, whom he regards as only a civilian anyway, with little or no authority to command him to do what perhaps may be objectionable to his tastes. Again, dental surgeons are not allowed to wear full-dress uniform. It was probably con-

sidered that they, being only temporary members of the army, would not care to spend the amount of money necessary to procure one of the elaborate gold-lace uniforms of this kind. What is the result? Simply this, that on many occasions all officers at the post where a dental surgeon may be serving are directed to wear full-dress uniform at some great function or ceremony. This, of course, deprives the dental surgeon from attending, and complicates matters, because on all occasions of this kind the officers on the post are *ordered* to appear; so he has either to stay at home and disobey orders or go without the dress uniform, still in disobedience of orders.

In this connection I will cite two instances that have come under my recent observation. One was the case of a dental surgeon stationed at Fort Myer, Virginia, across the river from Washington. On last New Year's Day orders were issued that all officers in Washington and at Fort Myer should report at Army Headquarters at 11 o'clock January 1st, to call in a body and pay their respects to the President. This order directed that they should appear in full-dress uniform with side arms, and the dental surgeon being unable to comply with either of the above provisions deemed it expedient to request permission to leave the city the day before, that the above order might be evaded.

The other recently occurred at a post where all officers, having been invited to a formal afternoon function, were afterward ordered to appear in full-dress uniform and side arms. It being impossible to avoid disobedience of orders, anyway, the dental surgeon attended in frock coat and high hat, the only man in the post compelled to appear conspicuous in a class by himself. Nothing in regard to his disobedience of orders was ever heard of, however.

You may all say that there is no disgrace in the wearing of civilian clothing, as above stated, which is quite true; but at any army post where one is supposed to be an officer, or at least a quasi-officer, and is strenuously struggling to maintain even that status, I must say that to appear different from all the rest places a dental surgeon in a more or less humiliating position and indicates to him that he is one of the army only through sufferance.

Incidents of this character have not occurred in the Philippines for the reason that there the only full-dress uniform prescribed for all officers is the white one, which dental surgeons are allowed to wear.

The question of quarters at the various posts is another matter that brings up the objectionable features of this miserable contract status; for it makes no difference how old a dental surgeon may be either in years or in his profession, how able he may be in the performance of his specific duties, how high he may have stood or stands in his profession or socially, he is usually not allowed a choice in the selection of quarters until after everyone else of the commissioned *personnel* on the post has been satisfied; down to the youngest first lieutenant. This does not seem right or just, but it is one of the "ways of the army," and *is* right from their standpoint, as the dental surgeon has no rank, consequently no real official status. The same conditions prevail in the selection of staterooms aboard army transports.

What is urgently required is a permanent reorganization of the corps upon a graded commissioned basis, so that there may be some future held out to the suc-

cessful and efficient dental surgeon—a future in which he may progress in rank through promotion; where he may be given the privilege of the longevity pay accruing from his length of service; where he may be allowed the accustomed ten per cent. foreign service pay equally with all other officers of the army; where there may be a certainty of continuous service while his health and efficiency hold good; where in case he is disqualified from further active practice on account of injuries or sickness contracted in the line of duty he may receive the proper and customary attention and in case of death his family may obtain suitable pension; where, after he has reached the age limit, fixed by law at sixty-four years, he may retire upon two-thirds of his pay for the work he has done and the services he has rendered to his country in the performance of his military professional duties; where he may enjoy the social distinction of a post without reserve and without feelings of humility, and can appear like the rest of the officers at the various functions formal and informal, and at various military ceremonies can feel and act as an officer and a gentleman.

The dignity of our profession demands that something be done for this corps, and that at this meeting we unite on some equitable and just measure for which all can work, putting forth their best efforts toward its early enactment before the corps loses any more of its more desirable men than the three who have recently resigned.

Discussion.

Dr. Wm. Conrad, St. Louis, Mo. I would like to ask Dr. Oliver if he found that erosion was more in evidence in the case of the officers than in the enlisted men.

Dr. Oliver. That is a hard question to answer offhand. I would have to refer to my statistics before attempting to answer it. Unfortunately I haven't them with me, not expecting such a fine point would be brought up. My recollection is that there was no perceptible difference between the number of such cases in the Philippines and in this country, nor do I recall that any case of erosion could be said to have been caused wholly by service in the tropics. Of the number of these cases found in the mouths of officers and men, who at most are only transient dwellers in the tropics, there is little doubt that the great majority of them had existed for months, or perhaps years, pribr to their term of service in the Philippines. I do believe, however, that there is reason to suspect that service in the tropics, with its debilitating effect upon the system, consequent disturbed nutritional functions, character of food, changed habits, etc., has a marked tendency to facilitate the development of this disease when once established.

Dr. Conrad. I thought perhaps Dr. Oliver might have had an opportunity of discovering a difference. Almost every patient that comes to my office has more or less erosion. Without egotism, I would say that the class of people I work upon are subject to great social and nervous strain. The question was suggested to my mind by a report on the literature of erosion by a committee appointed by the Illinois State Dental Association. I understand this committee is still studying the question, but has not yet determined the cause of the malady. If it be due to the environment of those in a higher social position and be not manifest

in the laboring class, it is a point well worthy of being studied.

Another point I wish to bring before this meeting, suggested by Dr. Oliver's paper, is the word "resorption." It means "reabsorption." My claim has been that it is only manifest in the case of the deciduous teeth, but Dr. Oliver claims that it is manifest in the case of the permanent teeth. I had a conversation with him on the subject, and I believe he has made a statement or suggestion in advance of the idea which I have maintained for many years—that resorption does occur in the permanent teeth; that means that something has been deposited and has been taken up by the circulation. The carious débris of broken-down teeth is carried into the saliva and lost by expectorating or swallowing. After all the teeth are extracted we have a constant loss of alveolar process until nothing remains but the jawbone itself. On this question up to last night I was not satisfied. I have maintained for many years that the resorption process only pertained to the deciduous teeth and the deciduous alveolar process.

Dr. J. Y. Crawford, Nashville, Tenn. I think our profoundest thanks are certainly due to Dr. Oliver for the amount of labor he has performed in arranging this very satisfactory report upon what has been accomplished in practically four years in the military service of our country. During the mobilization of the United States government troops at the time of the Spanish-American war it was my privilege to visit the large military camp at Chickamauga, where at one time one hundred thousand soldiers were being prepared for active service. The Tennessee Dental Association held at about that time a meeting on Lookout Mountain, and we were invited to visit the military camp. In visiting the various commands and divisions, we were cordially received by the commander-in-chief and came in contact with a large New York regiment which had camped near a large spring which we had selected as the site upon which our luncheon was to be served. At about 12 o'clock, when the soldiers had finished their midday meal, some came with their tin buckets to get water, and one came along with his tooth-brush and sat down to clean his teeth. I called the attention of my companions and said, "He doesn't know how to clean his teeth." I said to him, "Young man, I am a dental surgeon, and I see you cleaning your teeth, but I am sorry to tell ycu you have not cleaned them, as you have bread and meat in your teeth right now." I said, "Let me see." That crowd of boys gathered around, and it seemed to attract attention when I looked into the man's mouth. It was one continuous row of disease from one end of the line to the other. I assure you the condition of that regiment's mouths was enough to excite mutiny. Shame on the American people that they have not done better for the dental condition of their military service!

I am anxious to make effectual this paper by a gentleman who was in the service and who had the courage to come before the National Dental Association and make the announcements he did. We must appeal to Congress to get what we need. How strange it is that the American people can put their hands down in their pockets and pull out fifty million dollars to buy the right and privilege to dig a ditch across the Isthmus, and yet have not money enough to support the dental surgeons department in the military service. I am not opposed

to the Panama canal; let us build it, but not at the expense of the teeth of our soldiers.

We have the worst teeth, almost, on the face of the earth. Climate, food, mixture of population, etc., has caused this condition of affairs. The statement has long ago been made and frequently repeated, and I turn it over and over again, and will do so until the obstinate American people understand the significance of a scholastic population of which ninety-five per cent. have decayed teeth. The man who will not uphold in the Congress of the United States any measure tending to ameliorate this condition of affairs, is not qualified to be a senator in the highest sense. Ninety-five per cent. of the children of this country have decayed teeth. Of all the diseases to which man is subject, whether it be inherited or acquired, no disease is so amenable to rational, intelligent treatment as dental caries. Of all the questions of public health, disease of the oral cavity demands more attention at the hands of the American people than any other question of public hygiene. This will certainly explain my enthusiasm.

Dr. M. F. FINLEY, Washington, D. C. At the outset it was very difficult to get Congress to realize that there was need for such dental service in our army, but the reports submitted to the War Department by the dental surgeons in the army have supported every contention we made in our efforts to establish this army contract dental corps, and in a personal conference with the Surgeon-general of the army I am pleased to say that he has frankly admitted that these reports tended to confirm all our representations in support of the actual demand for relief on the part of our army in the field and at the station.

Many years ago I had a conversation with the gentleman who is now Surgeon-general, and it was then difficult to get him to realize the importance of our end of the proposition. Fortunately at present we have his entire co-operation and support, and I happen to be on your Committee on Army and Navy Legislation which has been so ably upheld by this association, and the hope is well founded that within a reasonable time your committee will obtain results which will adequately maintain the men who go into this corps in positions of commissioned rank which will honor them and honor the profession.

Dr. JAMES MCMANUS, Hartford, Conn. This is the first time I have realized the position a dental surgeon placed himself in, in accepting a position with the United States government. I was surprised to hear Dr. Oliver speak of the way they were set aside at all great functions; and in such a way that they could not in decency and with respect to themselves accept these invitations. He said that some of them asked leave of absence for a day or so to avoid attending certain functions, because they could not appear in uniform fitting the position which they occupied. We say today that the National Dental Association has done a great deal for the support of this committee. We have not done anything like what we should have done in the past and what we ought to do in the future! We should send this cry up from every state in the Union! Every state has two senators and a number of representatives. If each individual dentist will interest the different dentists in his state, and will personally write to each senator and representative and place this clearly before them, and demand what we have a right to demand,

that the soldiers and sailors of our country shall be properly cared for by competent men properly ranked, much good could be accomplished; and I suggest that we hereafter do individually our duty. I took the liberty of writing to my own senator and representative.

Dr. A. W. HARLAN, New York, N. Y. It appears to me from the many points considered in the paper of Dr. Oliver, that he presented in figures the most eloquent arguments of the value of this service to our soldiers. In the three years he was in the Philippine Islands, he tells me, 30,000 soldiers applied for relief, involving 76,000 cases—that is, more than one treatment in a single individual. In addition to the cases treated by the dental corps in the Philippine Islands, the service was also responsible for the promulgation of the Philippine dental law. The service was also successful in preventing the organization of a so-called dental college in the Philippine Islands because it was not properly equipped. In addition to that he stated something about the condition of the teeth of the natives and their food, habits, etc., that might bear some relation to certain diseases of the teeth and gums. Finally he presented in a very conclusive manner the status of the dental surgeon of the army, and the relation in which the members of the corps stand to the commissioned officers; also a recommendation that refers to the reorganization of the corps on a permanent basis—that is the most vital part of the paper—seeking for this purpose the indorsement and approval of the National Dental Association.

It seems to me that if we listened to that paper, evidently most carefully prepared and with most accurate statistics, we should go to the head of the corps with financial and political support for the reorganization on a basis that will place the members on an equal basis with every commissioned officer in the United States army, whether medical or in the line.

Dr. J. A. LIBBEY, Pittsburg, Pa. I am sorry I did not hear the paper, but from the discussion I want to make one remark here to impress every member of this association if they intend to assist the committee of which I am a member —and that is, that whatever work is done should be done through the National Dental Association and their committee. We can get what we want through the National Dental Association and their committee better than in any other way. We have had obstacles in the way of independent work. I hope there will be an effort made in this association to discourage any individual who would tend to disregard the committee. If the committee is upheld in its work we may accomplish the desired purpose. At the last session of Congress we were defeated by some work going on that was antagonizing our work. Let the work be done through the National Dental Association and through its committee. I hope this association will adopt a resolution supporting the committee, and requesting every member to constitute a committee of one to assist the work undertaken by the association through the Committee on Army and Navy Dental Legislation.

Dr. J. N. CROUSE, Chicago, Ill. You do not want members to do individual work with their senators and representatives?

Dr. LIBBEY. Certainly we do, but to make their report to the committee, and not endeavor to get them to work outside the association.

Dr. McManus. I am not opposed in any way to the committee. I want every member to assist the committee in their personal efforts with the representatives and senators and to carry out the ideas and wishes of the committee.

Dr. Libbey. Nothing I said was in criticism of Dr. McManus, and I hope every member will do as good work as he can to assist our committee.

Dr. C. R. E. Koch, Chicago, Ill. I have felt very deeply interested in this subject ever since the instituting of dental surgeons in the army, and have felt much chagrined at the fact that dental practitioners receiving army appointments are considered as neither officers nor gentlemen. I hope that those of you who have ever served in the army or have had any experience in connection with it will understand the idea I wish to convey. I have great admiration for the men who are willing to devote their lives to the cause of Uncle Sam's soldiers, submitting to conditions that self-respecting men cannot help but feel the humiliating influence of. The position of the army dental surgeon is not defined officially as either officer, non-commissioned officer, or private, as he belongs to neither of these classes, nor does he belong to the line of the army; he is only a sort of adjunct to a very important staff corps in which he seems to have been put on endurance. In army social functions he does not rank as a gentleman. I think the time has come when all this should be changed. Even the uniform provided is so distinctive as to institute inquiry by its invidiousness.

I believe that the service of these men has been properly appreciated generally and that the experimental stage as to the value of the dental surgeon in the army is now over. I believe that the time has come for the government to establish a recognized dental department as an integral part of the army and navy of the United States, ranking as the peer of any other department and entitled to the same distinctions as the other departments.

I am fully conversant with the methods governing the departments in Washington. It will not only be necessary to enlist the support and co-operation of the members of the House and of the Senate, but it will primarily be necessary to enlist the sympathy of the heads of the medical departments of the army and of the navy. These gentlemen are constantly on the ground, and their influence with the members of Congress is not to be lightly regarded, therefore I would suggest that the committee which may have this matter in charge do not ignore the Surgeon-general's offices in Washington, but on the contrary secure their co-operation.

I personally obligate myself to do everything that one individual can do to further this movement, and to endeavor to enlist a number of the congressional delegates from Illinois in its support.

Dr. Williams Donnally, Washington, D. C. I should like the opportunity, since the objects committed to the Committee on Army and Navy Dental Legislation have been debated, to say a word. I have been a member of this committee for seven years; have handled all the correspondence, have drawn all the bills presented to Congress; also presented the profession's claims for commissioned rank to the War and Navy departments and to the committees of Congress, and have endeavored to keep the profession well informed in regard to the methods of promoting the profession's interest

in the premises. The committee has had the hearty and continuous support of the officers and Executive Council of this association, of a large number of influential and earnest individual members of the profession, and also of university presidents and dental college faculties. Only a few, perhaps not more than a half-dozen in the dental profession, have antagonized or interfered with the attainment of this object of the profession. The attainment of the object involves a judicious conception of the most intricate and delicate problems and demands a perfect concurrence on the part of all concerned.

The Surgeon-general of the army has advised interested persons who called on him that all should work together with the National Dental Association Committee to gain anything at all. How can we hope to gain even the simple and modest provisions of the army dental bill reluctantly consented to by the Surgeon-general and reported against by the general staff, by the present and also by the former Secretary of War, while there is discord in our ranks, in the face of the fact that the army medical bill failed of passage notwithstanding that it was supported by the American Medical Association; by the representatives of each state medical association, and directly by more than 2300 county medical societies; by the Surgeon-general, by the general staff, by Secretary Taft and ex-Secretary Root, by the Senate and House Committee on Military Affairs, and by President Roosevelt in a special message to Congress? How many of you realize or even attempt to weigh the difficulties and obstacles to be overcome by our profession under the leadership of your committee? How many realize the significance of what has been accomplished in spite of powerful opposition, by the terms and present status of the army and navy dental bills? Remember that the War and Navy departments never supported the proposed dental legislation, nor has the dental profession done so with anything like the unanimity and zeal with which the medical organizations support pending medical bills.

Your committee has been for seven years your servant, doing your will at a sacrifice and with no hope of reward in this world. If it faithfully represents you, support its efforts; if it does not, discharge it and lift the burden. Any interference with the plans of the authorized committee, or any individual effort inconsistent with these plans, may defeat the object, as interference and effort has already retarded and made more difficult the attainment of the object. No one on the committee has any personal interest whatever in the result, nor has the committee at any time consented to terms less favorable than are possible of attainment through realizing the force of the warning of War department officials that the more we ask the less likely we are to get anything at all. If this meeting had given half as much time and attention to the legislative problems confronting your committee that you have to incidental aspects of the subject presented in the paper and in the discussion, you would be better prepared to form a correct judgment as to what should be the proper attitude of the profession in the premises.

Dr. OLIVER (closing the discussion). I am much pleased to hear so liberal and spirited a discussion of the paper. It shows you are interested in this important work of our corps and keenly appreciate the fact that some plan must be formulated to provide for its assured

permanence. It is hoped that the several factions of the corps' friends, who have at different times sought favorable legislation for it, will be able to get together and agree upon some one scheme for its reorganization that will meet with the approval of all who are interested in the matter. Then a united effort may be made toward its early enactment.

We do not aspire to high-sounding titles or rank, but we do believe the time has arrived when as representatives of a noble and scientific profession of universal recognition, we should have a just and permanent military recognition in the regular establishment of the army, with rank sufficient to sustain the dignity of professional men, and pay enough to properly maintain that position. A reorganization should contemplate at least three grades, so that some future may be held out to the successful and worthy men of the corps, with something to strive for as the occasional opportunities for promotion occur.

It should provide for continuous service while health and efficiency hold good; proper disposition of those injured or disqualified by sickness contracted in the line of duty; suitable officer's pension for the family in case of death while in service; longevity pay accruing from length of service; a ten per cent. increase of pay for foreign service as all other officers are allowed, and privilege of retiring at sixty-four years of age with three-fourths pay for the good that has been done in the country's service.

This will give more of an equality status to the dental surgeon, and will be highly beneficial in many ways, for then he could enjoy the social functions of the military post without reserve or humiliation, and could appear on all formal occasions feeling and acting as an officer and a gentleman. Such a reorganization could be maintained by the government for over four thousand dollars less money annually than the present organization costs, and would undoubtedly give far greater satisfaction to all concerned.

I have here several articles that may interest some of you, viz, statistics of the Philippine Board of Dental Examiners; snap-shot pictures of army dental offices in the field and elsewhere in the Philippine Islands [see pp. 49 ff.], records of cases presented and operations performed [page 59], and other things that any of you are welcome to inspect.

I thank you for the courtesies extended me.

[FROM SECTION I: READ IN GENERAL SESSION.]

The D.D.S. Abroad.

By R. H. HOFHEINZ.

IF time permitted, I would gladly give a bit of history of the D.D.S. abroad. I am limited, however, and must condense my article into the most essential facts, together with the appeal which comes to us from the D.D.S. of Germany at the present time. The Americans have always expressed pride in their foresight, in their sharpness, in their ability to anticipate desirable results. This, however, is scarcely a national trait, as others must be given credit for the same qualifications. When the English dental profession applied to Parliament for a dental law that would weed out the foreign practitioners, they discriminated against all American schools except Harvard and Michigan. Had they included these two schools with the others, the act would have become prohibitive, and the English dental mind would have experienced certain defeat.

For the time being Harvard and Michigan were excepted, which was a shrewd move on the part of those applying for the act. It appeared like acute discrimination between good and bad schools, and this appealed to the sense of fair play, a thing that appeals to all Englishmen. This act, however, was nothing more or less than an entering wedge for that subsequent legislation which wiped both Harvard and Michigan from the list of recognized schools.

Germany is ready to do the same thing, with the exception that it recognizes Michigan only as a state university, classifying all others as "private institutions." Recent action taken by the German authorities has awakened feelings of the gravest apprehension on the part of the American dental graduates practicing there. Decision after decision has been handed down by the several German courts, each giving to the ever-ready German dentist new weapons with which to prosecute his American competitor. The German Society of Doctors of Dental Surgery, with the able and untiring assistance of Consul-general Dr. Worman of Munich, has been doing all in its power to repulse the repeated attacks made upon its members.

The German-American Dental College of Chicago, and allied swindle institutions, have so prejudiced the German government officials that through the

latest supreme court decisions they have not only refused to recognize the American graduate as the equal of the German Zahnarzt, but have classified all D.D.S.'s in Germany with the non-graduates or Zahnkünstler, a class notorious for their lack of theoretical preparation for the profession, and of whom no dental education is required by law. Neither is the D.D.S. granted the lawful protection due to every German graduate against accidents happening to patients in the practice of the profession, which alone may lead at any time to the ruin of any of the practitioners. Within a short time the use of any medicaments will be forbidden the D.D.S., a measure which will compel the American dentist to close his office.

The most important adverse decisions are based upon the supposition that the American dental colleges are private institutions and unlike the German universities of like character, which are state institutions—are not of the same standard and their diplomas do not possess the intrinsic value of those granted by state universities. It is difficult to convince a foreign nation that so many schools are uniform in their requirements and points of excellence as are ours. It is well known to us that certain dental schools of the state of Illinois, the statutes of which permit the incorporation of degree-granting institutions which have practically no responsibility whatever, have sold diplomas to students all over the world. We have made every possible effort to annul the existence of such shameful spots upon our escutcheon, and it remains for this society, together with the National Association of Dental Faculties, to do something energetic and definite for the D.D.S. abroad, in the matter of compelling recognition of the diplomas of our reputable and recognized schools.

I have in my possession papers which show in detail the enormous amount of annoyance that the D.D.S.'s of Germany are subjected to, and also the great amount of fruitless labor they have undertaken in endeavoring to establish their good right. I quote only from the letter of a D.D.S. of international reputation: "I have been called to the police station three times lately for exhibiting my D.D.S. on my card, the telephone book, and in my hall, though on my sign in the street I have nothing but Boedecker. One of the Berlin dental societies has made it its business to annoy American dentists, individually, as soon as they see a D.D.S. anywhere, and such complaint need not be accompanied by the name of the accuser." This distinguished gentleman has since discontinued his practice in favor of his son, an American D.D.S. and German Zahnarzt.

The remarkable paradox remains that the law-makers and the heads of the different governments have their valuable dental organs taken care of by the D.D.S. Members of the Kaiser's family entrust the care of their teeth to a D.D.S. well known to me. One of our friends practicing in England failed to get on the register. Though he was willing to make reasonable concessions to go before the board, their conditions were such that he could not do so and still retain his self-respect. The president of the board of examiners and his *confrères* officially ostracised the D.D.S., but this same president thinks it necessary and makes it convenient to travel forty miles to meet an appointment and to be served dentally by this same practitioner. Gentlemen, have we no power at command

to compel the recognition of a degree which has been a synonym for excellence for the last fifty years? It seems hard, unjust, almost laughable, to have a degree null and void which has been signed by men whom the dental world has recognized as the worthiest and foremost members in the profession.

It is useless for me at this time to point out the superior qualities of most of our American dental schools over those abroad. Everything done on the other side of the Atlantic is more or less a clever imitation of our own schools. Whether the fact that all universities abroad are under state supervision compensates for other existing deficiencies is not under discussion. The fact remains that the European countries which have not yet stamped the D.D.S. degree with the seal of death are making the fight on this specific question.

Drs. Van Beust and Milke of Dresden, and others representing the Society of the American D.D.S. abroad, have requested to have us send them the following documents authorized by the N. A. D. F. and the N. D. A.: (1) A certificate expounding as clearly as possible in what respects the American dental college is a lawful corporation; its relation to state boards or to a state superintendent of public instruction, if such exist, and showing in what respects it may be considered a state or public institution. (2) A certificate setting forth the requirements for matriculation; the number and character of the obligatory branches of study; the requirements for attendance of lectures, the methods used in examining and the thoroughness of the examination of each candidate for graduation of every college belonging to the N. A. D. F. (3) A certificate stating in what respects the N. A. D. F. is a legal corporation; its function, its code of rules, and the relations of this body to each college. (4) A certificate clearly proving the legal value of a diploma from any of these colleges and showing what rights are granted thereby. (5) A complete list of the reputable dental colleges of the United States. Also answers to the following questions: (1) Does the degree of Doctor of Dental Surgery, irrespective of all other rights it may confer, privilege any graduate without additional preliminaries, to *merely call himself* "Doctor of Dental Surgery" in any state of the United States? (2) Is the graduate of dental surgery qualified by law as a medical person? May he without first consulting a doctor of medicine operate, administer medicines internally, and produce general anesthesia? It would be of value to have the two last-mentioned documents signed by the governor of a state; if this be not possible, then by the state boards of dental examiners.

I will present a relevant resolution after the discussion of my paper.

We are living in the age of arbitration. The Russo-Japanese war may be the last great war the youngest of our generation will have witnessed. We are drifting toward an educational *entente,* and, paradoxical as it may seem, it is Germany, which today is fighting our D.D.S. degree, that has principally taken the initiative in this educational interchange.

The Faculty of Philosophy of the University of Berlin announced officially that graduate work done in any of the fifteen institutions comprised within the Association of American Universities shall henceforth be accepted as equivalent to work achieved by resident students at a German university, the only restriction made upon the candidate for

the degree of Doctor of Philosophy being that at least three semesters shall be spent in actual residence at a German university; the remainder of three years, or six semesters, however, may be taken in one or more of the American universities specified.

This action, it need scarcely be pointed out, is not only a singularly definite recognition from a conservative source of the worth of graduate instruction in our universities, but it is also important for its bearing on the higher education in both countries. A concomitant action of the Berlin faculty is that the bachelor degree of any American institution will hereafter be accepted at matriculation as equivalent to the *testimonium maturitatis* of the gymnasium, the preparatory school for the university.

The German emperor has recently suggested a system of interchange between the members of the German and American universities, a most significant step toward educational reciprocity. The dictatorship in education has long and rightly been assumed by Germany, but it is making way for a broader and more liberal construction of the purposes of education.

Though we gladly grant the European nations superiority in most of the educational matters, I assert, and with me all of you agree, that dental education has been far superior in this country ever since dentistry embarked upon its present scientific independence. We have a moral and scientific right to claim the first position among the nations of the world, though we may not be free from blemish.

It is our duty to see that a title which has made American dentistry known all over the world is not exterminated in the countries which are but imitators of our dental achievements. If such rights cannot be attained in a proper spirit of educational reciprocity, I believe that even diplomatic help should be appealed to.

Our refreshing diplomacy has to its credit so many great achievements that it should be an easy matter to regulate this question. A new system of international educational interchange will, when properly adjusted, not only add in its way a new element of value to academic education, both here and abroad, but will inevitably prove a long step toward that unification of the highest education which, however different its details might be, should make it essentially the same in spirit and effect in all the progressive nations.

Discussion.

Dr. JAMES TRUMAN, Philadelphia, Pa. It is a matter of regret with me that I feel obliged to antagonize some of the sentiments expressed in this valuable paper of Dr. Hofheinz. In this country some have been working for years for similar laws, and now they are coming back as a boomerang and are proving an injury to our graduates. It is nothing new for the Germans to prohibit the use of the D.D.S. degree, for it is as old in my experience as 1877. Indeed, that prohibitive action of the German law is necessary for the government of the profession in that country, and I am in sympathy, I must confess, with that attitude to a large degree. It is a well-known fact that American dentists have been invading the European countries—not only American citizens, but Germans who come here to graduate and then return to their own country to practice.

It is perfectly natural that individuals over there should be in opposition to them, and the influence of that paternal

feeling that is always present in continental countries leads them to go to their government, and the German government says, "No one shall practice dentistry unless he has our degree;" and therefore the D.D.S. degree is not recognized. I was brought before the police court of Hanover while practicing dentistry when a resident there because I made use of the D.D.S., and, absurd and paradoxical as it may appear, at the same time the police president said, "If I want to have any dentistry done I will come to you, but if you want to practice under the D.D.S. I will have to arrest you." At the same time I had the Hanoverian court in my *clientèle*.

Let us take the moat and beam out of our own eye before we bother about that in our brother's eye. We have laws here. I cannot go into New Jersey today and practice, for as soon as I should open an office some man would come and say, "You have not registered in New Jersey." The German is simply doing the same thing. It is not fair for this organization to go before the world and ask the Germans to give up their protection of the degree of Zahnarzt. Let us look after our own country, and allow a man who has legal qualifications in one state to go into another if he should so desire and practice. Then we could go into foreign countries with clean hands and demonstrate consistent methods. You do not do this, however, and you do not intend to do it, and therefore it is impossible to grant them reciprocity; consequently all the efforts made will be futile.

Germany has accepted Michigan University because it is a state institution. All the rest of our institutions are supposed to be private. Can we blame Germany? We have high universities here, but they are not all state institutions. The German loves law; he loves the protection of the government; he wants the great seal of the government on every diploma that he is asked to accept, and unless it has the power of the state behind it he will not be willing to recognize it. Thus there never will be reciprocal action between foreign countries and our own until all our educational institutions are based upon something like the order of the German schools. I have a high regard for the German method of education, and hold it far superior to the education of this country, because it is based on a system. There is no system here in our educational and dental institutions, and this leads to antagonism one with the other. Let us go before the world, I repeat, with clean hands, and not depend altogether upon law for the maintenance of our profession.

Dr. E. C. Kirk, Philadelphia, Pa. In studying this matter, as I have done for the past several years, a growing conviction has developed in my mind that there is no political question—using that term in a broad sense—which concerns the dental profession more closely than the one under consideration. The matter of the present relations between Germany and America in regard to the recognition of the dental degree is simply a practical expression of the professional attitude of mind in both countries. The question is a complex one. It is complicated by many factors, and by one in particular that will have to be looked into carefully in order that we may reach that condition stated by our good friend Dr. Truman. We should go before these governments with clean hands and then make our demands. But before we can reach that point there are a number of things to be done.

The whole dental world is familiar with

the tremendous work begun and carried out by Dr. W. C. Barrett of this city. We know the causes which brought about this activity. The impression made by the work of Dr. Barrett has made itself felt in the minds of the German people. The question of the illicit diploma traffic is the club by means of which the German practitioner has been enabled to express his dislike for the American "Doctor" title. The state of Illinois, through conditions then existing there, made the traffic in illicit diplomas possible. The proof of the possibility is that it did exist —to the dishonor of the American title wherever it might be. As Dr. Truman has outlined, the American title has been a term to conjure with. The American dentist has practiced in Germany often to the disadvantage of the native practitioner. The public has somehow become educated in the belief that the American is the best practitioner. That view naturally aroused jealousy which could not fail to take advantage of the argument furnished by the bogus diploma mill and its illicit degrees and cause it to be said, "They are all alike; we will make no distinction—we will throw the whole lot into disrepute."

I am not in position to tell all that I would like to say at this time about the status of the effort which is being made to straighten this matter out. I will say, however, that I am not quite so disheartened with regard to the outlook as Dr. Truman seems to be; I am rather more optimistic in regard to it. I believe we have almost reached the "psychological moment," the time to strike, and I further believe that the avenue through which the equitable adjustment of this difficulty is to be wrought out must be through diplomatic representations between Washington and Berlin. The state has taken up the matter. We have the assurance that they are taking up the matter sympathetically; I know in detail what has been done, and I think the outlook is hopeful for a better understanding of this question being arrived at as between the governments of the United States and Germany.

The United States government has given a quasi-recognition to the D.D.S. degree, by incorporating a recognition of it in the dental law of the Philippine Islands, and it is in a position to recommend to the German government a list of reputable institutions whose degrees may be accepted. Our government is interested in this matter, and the German government is sympathetically inclined to give it a hearing, and the principal parties involved are in a position to do something. I do not feel at liberty at the present moment to say any more than that the outlook is encouraging.

I regret exceedingly that Consul-general Worman is not here to speak on this matter, but he will be present tomorrow and will make a report to the National Association of Dental Faculties when that body convenes. I do not know the nature of the recommendation Dr. Hofheinz will make, but I hope it will take such a practical form that this body may commend it to a certain number of their members for consideration with power to act in co-operation with the Faculties Association to further this work, which can be referred back to the main body for resolution so that concerted action may be taken, and thus remove this blot from our escutcheon, and that we may go with clean hands to ask what we desire.

Dr. C. R. E. Koch, Chicago, Ill. I am exceedingly interested in this paper and the discussion that has followed. I confess that I am more in sympathy with Dr. Kirk than with Dr. Truman; I feel very optimistic. Under the constitution

of the state of Illinois, unfortunately, a charter can be obtained for any reputable purpose upon the payment of the fees and compliance with the regulations for issuing the same. The butcher, the baker, and the candlestick-maker can, if they so desire, organize a dental college. This has given the opportunity for the establishment of several so-called dental colleges in Illinois in the past which brought disrepute not only upon our state, but upon the entire country.

The dental law of Illinois which has been in operation since 1881 compelled the Illinois State Board of Dental Examiners to issue a license to all graduates from reputable schools without examination. This constituted the said board, by inference, the judges of the reputability of schools. For more than twenty years the board fought bravely to keep down and withhold its recognition of diplomas issued by bogus or inefficient schools, and made an herculean fight against the traffic in diplomas. There was a period of a few years during which the board was less watchful and less conscientious in the discharge of its duties in this respect, but for more than five years the dental officers of our state have again labored vigorously for the attainment of the highest position possible in the dental schools, not only of our state, but of all the others. The courts of Illinois have sustained them in this endeavor, and have by decisions from the bench assisted in removing the blot from the escutcheon of Illinois and its dental profession and educational institutions.

And now Illinois comes to you with her newly enacted law of this year, which empowers its board of dental examiners to make reasonable rules to establish a standard for dental schools or colleges which these must live up to in order to be considered as reputable, and in order to have their diplomas recognized as a basis for admission of the holder to the examinations for practice in the state of Illinois. The power of dental colleges anywhere to confer vested rights to practice dentistry in the state of Illinois has been taken away. Hereafter anyone desiring to be permitted to practice in our state must present himself for examination before the board, and in order to do this must possess either a diploma from a reputable dental or medical school or college, and pass a satisfactory examination in dentistry. Or if he has been in lawful practice for five years immediately preceding his admission to practice in Illinois or in any other state of the Union or foreign country, he can also be admitted to the examination of our board. The state of Illinois now, as well as most of the other states, confers the right to practice under license; the schools simply prepare the candidates for these examinations. I believe that this is the entering wedge toward the attainment of reciprocity between the states, and when we shall have accomplished this end ourselves, and it will not be many years—Dr. Truman will be here to see it—then we shall be able to say to the rest of the world, "We tender reciprocity to you."

Let us be fair to Germany. Their ideas and ours are entirely dissimilar with reference to practicing a profession and using the title of doctor. We here in America believe that it is necessary to restrain one from performing certain functions unless he has given to the people's representatives—the dental examining board—evidence of his fitness to do so. We are not much concerned about whether he calls himself "Dr.," "Professor" or "Mr." In Germany the title is the important thing; they do not seem

to care so much as to what one undertakes to do, so long as he does not employ or use the title of doctor. Titles are conferred there by the government, and it is not easy to reconcile Germans to the validity of titles fairly earned by their possessors and conscientiously bestowed by recognized institutions of learning. I realize now the difficulty our German *confrères* are laboring under, but I believe that relief can be given them, and that the German government may be induced in time to change its attitude toward American dental institutions. From information which I have privately obtained, I have learned through a source that cannot be questioned that no dental school of the United States is recognized there at the present time. They do not understand that here each state is overseeing and controlling dental education, just as obtains in Germany. Because we have not a centralized form of government but leave this matter to be adjusted in each state according to its particular laws, they have formed the belief that government supervision does not exist.

It is my belief that a committee should be appointed from this body and from the National Association of Dental Faculties, which should invite the German government and the Germans to thoroughly investigate our educational institutions and the laws of our states supervising their work. Let them turn the Roentgen rays on our institutions and let them ascertain whether they are worthy of recognition. I have no fear of their verdict and believe that international reciprocity would follow. We cannot hope or expect immediate results, but must abide our time.

Let us work together for this country first. The dawn of reciprocity among states on the American continent has already appeared. Michigan, New Jersey, and the Northwest Territory of Canada have established mutual recognition of their boards' work. This is the entering wedge, and when the few remaining states shall have passed laws similar to those of the great majority of them, requiring examinations from all candidates for admission to practice in the several states, based upon the possession of a diploma from a reputable school, I believe that reciprocity will follow between the state boards discharging their duties on the same lines. When all boards shall have the same standard for the schools and conduct their examinations on the same lines and exact the same requirements from candidates, the verdict will be alike. In each state the board will be willing to recognize the work of another board just the same as now the faculties of the different schools recognize and give credit to students for work done in any other school.

The time is coming, and I expect to be here long enough to see it, when this recognition will be universal among our state boards.

Dr. J. N. Crouse, Chicago, Ill. The state of Illinois of course is in disgrace on account of the appointment of a bogus examination board a number of years ago. I was made chairman of the prosecuting committee of this association, the National Association of Dental Faculties, and the State Board of Illinois. In that matter I went as far as the funds went, and I began to figure up I was seven hundred dollars out, when I thought it time to take a rest and see where the funds were coming from. The work is not complete, but it should have been completed before this time; it is possibly my fault. I have not made a report, and I want an opportunity to make it at the proper time here. The state of Illinois has appropriated $3200 toward the prosecution; the National Association of Dental Faculties has

appropriated $1200, and this association $1000. These are the funds which have been put into my hands up to this time. We have many indictments on this score to pass in Chicago, and for good legal reasons I have let them hold over, and the parties are under bond. Last Tuesday I received word by accident that someone was doing something in the Smeizer case, and I sent Dr. Reid over to the state attorney's office and learned that the case was up for reconsideration, but that it would be dismissed at the September term of court. We have put the German-American College out of business long ago. I have talked to the president of the Federation, and some action ought to be taken on this question. It really should have been taken a year and a half ago.

In regard to reciprocity, a decision of the supreme court recently is to the effect that one cannot deprive a man of his means of livelihood no matter if he has a diploma or not, provided he is qualified to carry on his work. The amendment should be that the state boards have the police power to say who shall practice, no matter where the professional education was obtained. Then they will examine the product of the schools and not the diplomas. If they are fitted, give them the authority to practice. I know I am correct in my authority. I want to make a report as the prosecution committee and give my financial statement.

Dr. H. J. Burkhart, Batavia, N. Y. I think in the discussion of the paper one material point is being lost sight of. When the question is taken up through diplomatic channels, the first question the German government will ask is, "Will you give us equal privileges in your country?" As you well know, our state laws are not in harmony with regard to granting licenses to practice, while on the other hand the German government has a general law for all of her provinces. In my judgment, the only thing which is likely to be accomplished will be some arrangement with the German government whereby those who were in practice prior to the time that they were placed under the ban may have the privilege restored to them. I do not believe that it will be possible to obtain the right for our graduates to practice without restriction until we are willing to grant the same privileges throughout this country.

A great deal has been said about enacting a general statute by Congress governing the practice of medicine and dentistry. I do not believe that this can be brought about for a great many years, on account of the peculiar relationship of the states to the general government and the reluctance on the part of those in national authority to interfere with the police power of the states in matters affecting the public health. I should be very glad to have a committee appointed to take up the matter through diplomatic channels, and if possible endeavor to arrive at some temporary understanding at least with England and Germany, so that those who are now in practice in those countries may have an opportunity to continue their work undisturbed.

Dr. Hofheinz (closing the discussion). If, as Dr. Truman thinks, the question has existed since 1877, it has only been in a modified way, because men like Evans, Abbott, Jenkins, and many others have practiced unmolested up to this date. But Dr. Boedecker and others who have an international reputation are molested every day, and in a very unpleasant manner, and it is for this reason that I have requested you to do something definite, and I beg to offer the following resolution: (See page 11.)

[FROM SECTION II: READ IN GENERAL SESSION.]

The Nomenclature of Orthodontia.

By S. H. GUILFORD.

THE nomenclature of orthodontia is in more or less of a chaotic condition, owing to several causes. The rapid growth of the specialty, particularly within the past ten years, with the concomitant necessity of naming new conditions, forces, movements, etc., has created a need for new terms. As these were needed they were originated by writers according to their individual ideas, often without consideration, and more frequently without investigation as to their etymology and true meaning. Once appearing in printed form, they were adopted without question by other writers whose views were similar, and thus they have become perpetuated to a greater or less extent. In many cases new words were coined or adopted to take the place of older ones in use.

Had the new ones been intelligently selected so that they would express the idea intended to be conveyed more correctly or more scientifically, all would have been well; but unfortunately in very many instances they did not, and thus we had change without real improvement. In view of this, and influenced possibly by a spirit of conservatism, those to whom the older terms had proved satisfactory were unwilling to adopt the new ones, and thus confusion has arisen.

Undoubtedly the newer portion of the nomenclature of orthodontia contains many improvements over the old, but the old also has some valuable features that the new does not possess. If these opposing factions could be harmonized, the better terms being adopted and the worse ones eliminated, we should soon be able to place our nomenclature upon a scientific and satisfactory basis. Probably this is too much to hope for with human nature constituted as it is, and we shall have to wait for time to accomplish that which we would prefer to do immediately.

In the meanwhile let us try to hasten the desired end by urging those who have written and those who expect to write upon the subject of orthodontia, to give careful heed to the terms they use, employing only such as are sanctioned by good authority, adopting new ones only after most careful examination into their true signification and etymology, and with real broadness of mind discarding such as they have become accustomed to as soon as better ones are proposed.

One does not need to be a linguist to

enable him to select satisfactory terms. for a good dictionary, if consulted, would give him the correct definition and etymology of any word, and usually also synonyms and illustrative sentences.

In speaking of the jaws, whether including the alveolar process and teeth or not, they are commonly designated the upper jaw and the lower jaw, or sometimes the superior maxilla and the inferior maxilla. It would seem as though the time had come to adopt the nomenclature of the anatomists, by calling the upper bone the maxilla and the lower one the mandible. These terms are exact and specific and cannot be confounded.

The teeth in the maxilla should be called the upper teeth, and those in the mandible the lower teeth. The terms superior and inferior, once applied to them, should be discarded, for these words have other significations, sometimes denoting quality, and are therefore not definite.

In distinguishing the teeth in the front part of the arch from those farther back the six anterior ones are often referred to as the oral teeth, and the posterior ones the buccal teeth; as *anterior* and *posterior* are terms distinctly relating to position, and have no other meaning, they should be adopted.

The same terms should also be employed wherever possible in designating the position of parts of teeth or anatomical features, as the *anterior* root of lower molars, the *anterior* buccal root of upper molars, the *anterior* pit of a bicuspid. The terms mesial root, distal root, etc., are not as expressive or as anatomically correct.

Alignment is a term which in its strict etymological sense refers to objects placed in a straight line, but there is no good reason why it should not apply to those placed in a curved line or in a series of curves. It would therefore seem to be a good word to use in referring to teeth occupying their normal positions in the dental arch; and by the addition of the prefix *mal* we have a term designating the opposite condition.

Anchorage well expresses the point of stability from which or toward which we exert force, and we have as qualifying terms the words, *simple, reinforced, reciprocal, occipital,* etc.

Arch. We have the upper arch and the lower arch, and as to the various forms, we should do away with the uneuphonious terms "V-shaped arch" and "saddle arch." For them we can substitute "Gothic arch" and "constricted arch." In addition we have the "flattened arch."

Bite. This is a very inelegant term, and very unscientific as well, yet it has come into such general use that we can hardly discard it. Its distinguishing terms are *open, close, under, over, shortening, lengthening,* etc.

Interdental, referring principally, so far as orthodontia is concerned, to spaces existing abnormally between the teeth. is an excellent term, etymologically and anatomically correct.

Irregularity and *regulating* are terms that have been much criticized owing to the impression that they are not exact and not sufficiently comprehensive. That this is erroneous is shown by the definition of the verb "to regulate," which is, "to adjust according to a standard." Our standard of teeth properly aligned is that of the normal arch, therefore if they are out of their normal condition and we restore them to it, we certainly regulate them.

Consequently the verb "to regulate," with the participle "regulating" and the substantive "irregularity"—all are ety-

mologically correct, and as they are single words they should be preferred to phrases such as "correction of malocclusion" "dento-facial orthopedia," and the like.

Malposition may refer to one tooth or many, and is an excellent term.

Mal-eruption, signifying the eruption of a tooth out of its proper position, is equally correct.

Normal does not mean natural, as one would often infer from its ordinary use. Its definition is "conforming to a type or standard." Its synonyms are "regular" and "typical." Therefore the expression "typically normal occlusion" which we sometimes meet with is grossly incorrect, for if the occlusion be typical it is certainly normal, and *vice versa.*

Orthodontia, a compound Greek derivative, is the best term we have to express "the science of prevention or correction of irregularities of the teeth and the associate parts." The expression "a case of orthodontia," so often heard from the lips of the inexperienced or uneducated, indicates a misconception of the meaning of the term. We have a case of "irregularity," or "malposition," or "malocclusion," the correction of which involves a knowledge and practice of orthodontia.

Orthodontist denotes a practitioner of orthodontia. A newly coined word, but a correct and useful one.

Orthodontic has seldom been used, but it is as etymologically correct as *orthopedic,* and will doubtless prove equally serviceable.

Prognathism and *orthognathism,* the former meaning a protrusion of the mandible and the latter a normal vertical relation between the upper and lower anterior teeth, are strictly scientific words.

Mandibular protrusion, however, might well be substituted for prognathism, and the terms "double protrusion" or "bimaxillary protrusion" can be employed when protrusion both above and below is meant.

Orthognathism denotes the condition where neither protrusion nor retrusion exists, but where both upper and lower teeth help to form the normal facial outline.

In the matter of terms to express movement, or position after movement, we fortunately have a list that is not only etymologically unexceptionable, but which serves our purpose so admirably that we could not well improve upon it. Thus from the Latin word *trudo,* meaning "to thrust or push," we have by the use of prefixes—

Extrude, to force a tooth out of its alveolus, usually a tooth that has not fully erupted and which needs to be brought to the occlusal plane of its fellows, or a tooth that has been intruded by accident.

Elevate has sometimes been used to express the same movement, but is not as good a word for the purpose, particularly as it has already acquired a distinctive meaning outside of orthodontia.

Intrude is the exact opposite of extrude, and means the forcing of the tooth into its alveolus, either in cases of accidental extrusion or where the occlusal plane of certain teeth needs to be reduced for the improvement of occlusion.

Protrude, "to force forward," and *retrude,* "to force backward," refer usually to the movement of the anterior teeth. Each of these words has its corresponding substantive ending in "sion," expressing the condition instead of the movement.

Retraction, another Latin derivative, and meaning the act of "drawing backward" something that is advanced, while having nearly the same signification as retrusion, may well be adopted to indicate specifically the drawing of a tooth backward in the line of the arch.

Expand and *expansion* are terms of accepted value, though of limited use in orthodontia.

Rotate, used to signify the turning of a tooth upon its axis, is an admirable word for our purposes, since it so exactly expresses the idea intended, the definition being "to turn upon its axis, as a wheel," but when we seek for a corresponding word to express the condition or state of a tooth already in a turned position, we are met by a difficulty, since no exactly suitable word exists in either the English or the Latin language.

The word nearest to our purpose is *torsion,* but as this denotes *twisting,* and a tooth is never twisted, the term is weak, if not really incorrect; still, as we have no more suitable word we consider it advisable to retain it.

Occlude, from Latin *ob* and *claudo,* "to close up, or shut up," has become thoroughly incorporated into orthodontic nomenclature. It has largely superseded the term *articulate,* and should supplant it entirely. If occlude means "to close," it necessitates contact, and impliedly only such contact as a hinge-joint would permit.

Articulate, long in use as an anatomical term to indicate the free movement of a joint in the animal body, has a more flexible signification in that it permits contact in various ways, but to avoid confusion and to limit the number of words, we believe that *occlude* and *occlusion* should be accepted to mean the coming together of the teeth in any way that the mandibular joint will permit. This broadening of the meaning of the term occlusion, however, should not be extended to include its use in cases where there is not and cannot be contact. Such use is misuse and therefore unjustifiable.

The coined terms "infra-occlusion," "lingual occlusion," "labial occlusion," etc., where lack of contact is meant, are very incorrect, and their employment should be discouraged. So, too, the expression "open-bite occlusion," used to designate the condition in which the anterior teeth fail to occlude, and the term "close-bite occlusion," where there is too great an overlapping of the upper anterior teeth, are both manifestly incorrect, because the language does not describe the condition. Instead, let us say "anterior non-occlusion" for the former, and "excessive overbite" for the latter.

With the acceptance of the word "occlusion" decided upon, we may readily construct from it by prefixes or qualifying words a list of terms that will be entirely serviceable and etymologically correct as well.

Malocclusion has already been adopted to express any condition in which some or all of the teeth do not occlude normally, but as yet we have had no single word to express the condition which we recognize as normal occlusion.

As the Latin prefix *mal* is correctly used to designate a "bad" or "evil" condition, we would suggest the adoption of the other Latin prefix *bene,* "well," to denote the good or correct condition. We would thus have the word—

Benocclusion to denote normal occlusion, and it would be in entire accord with other Latin compounds—as benediction, benefactor, benevolence—that have been in use for ages.

The word *orthocclusion* would be equally expressive, but in the union of two words from different languages we produce a hybrid, which in an etymological sense is regarded as objectionable.

Nonocclusion is very expressive and

should be employed in the most liberal manner possible.

Anterior nonocclusion would mean failure to meet on the part of upper and lower teeth in the anterior part of the mouth.

Lateral nonocclusion, where several or all of the side teeth do not occlude.

Posterior nonocclusion, where some or all of the molars are lacking in occlusal contact.

Labial nonocclusion would signify one or more teeth in labial malposition so that occlusion is impossible; and

Lingual nonocclusion would indicate teeth lingually malposed and not in occlusion.

By the employment of the Latin prefixes *ante,* "before," and *post,* "behind," we may construct two other very useful words from the foundation term "occlusion"—

Antocclusion would signify occlusion anterior to normal; and

Postocclusion would signify occlusion posterior to normal.

Both terms could apply to a single tooth or to all of those in the arch. The adoption of these two compound words would do away with the employment of such clumsy expressions as "occlusion mesial to normal" and "position distal to normal."

All of the few new terms that I have proposed here are of Latin origin, as indeed are most of the others used in this branch of science.

Medical science derives its terms from both Greek and Latin, more perhaps from the latter, while electrical science and physics in general have taken all of their new terms from the Greek.

As Latin was the mother language of dentistry it would seem especially appropriate to depend upon it, as far as possible, for the roots from which our new terms shall be constructed.

Discussion.

Dr. JAMES MCMANUS, Hartford, Conn. It has been my experience in the past to listen to very good articles on this subject, among them one read by my good friend Dr. Palmer several years ago. Dr. Atkinson also was constantly speaking on this subject. Different professors and practitioners at various times have told us what we should do in relation to it, and still we have been going along at the same rate, using the same old terms, and the present generation is likely to continue to do so. At a meeting in New York last winter, largely attended, two gentlemen used terms that much to my surprise, were treated by many of those discussing the papers as if they were unacquainted with the meaning. Both were accomplished dentists and members of colleges with a strong and well-deserved reputation. The papers read before that and other associations will not change the habits of many of the older men of the present day. I wish to offer the suggestion that we appoint a special committee from the National Association of Dental Faculties. It seems to me one of the best things that could be done would be to select from among their members a committee that would thoroughly study this subject from its professional aspect, so as to formulate a standard of nomenclature that every dental teacher in these colleges would live up to, and then the future dentists coming into the field would have a nomenclature that each could understand. Our nomenclature can never be changed unless there is a definite understanding among the faculties of the different colleges in the matter.

Dr. C. S. BUTLER, Buffalo, N. Y. I believe there is scarcely a subject that can come before us as a profession which is of greater fundamental importance than that which relates to the formation of the nomenclature intended to express the ideas to be conveyed. In the development of a language intended to express the ideas of any cult or science, it is of the utmost necessity that at the beginning the words chosen should clearly define the thing described, and only those should be selected and adopted. It is an axiom in philology that at the beginning words are simply arbitrary and may have no primary relation to the thing they are used to express, but in a long term of years and by wide usage they become fixed and there is no power on earth to change them.

Orthodontia is a new science, and the truth is, accurate definitions of the terms used can only follow accurate and sharply defined ideas of the science itself. Therefore it is of the highest importance, it seems to me, that now, at the very beginning, we should insist that only such words and terms be selected and adopted as will most perfectly and clearly convey the idea intended to be expressed.

There is also another axiom or rather law of philology which must not be lost sight of, namely, that "One word may be used to express a whole group of ideas having relation one to another, but no word can ever be used to express two ideas which have no relation to each other." Hence it is that I would certainly—and I have done so on a former occasion—criticize our Committee on Nomenclature when it attempts to make articulation and occlusion, etc., express the same idea. These are things that cannot be expressed by one word, because they are dissimilar in every respect. It is also important, in the selection of a nomenclature to express a science, that terms which not only are applicable and have the most direct and perfect meaning of the thought which they are desired to convey be chosen, but that they be terms also which are not easily confused, are readily understood, and above all, that cannot be misapplied. Therefore very much of that which the essayist has presented in his paper is worthy of the most careful consideration and, I believe, adoption. The time has come when as a profession we must give heed to the language employed to express our scientific thought. If we are to be scientific and are to be regarded as a learned profession we must select those words only, and insist upon their adoption, which relate directly and express perfectly—or as perfectly as language can—the ideas which we desire to convey and to enforce in the teachings of this science.

Dr. J. Y. CRAWFORD, Nashville, Tenn. I wish to express my gratification at hearing this paper. In my experience with the National Dental Association and other associations, I have received as much help from Dr. Guilford as from anyone, and I thank him on this public occasion; but for the benefit of the younger members of the profession I wish to emphasize this important subject. I do not like the use of "mandible" for the lower jaw; I call it the lower jaw, and everyone understands what I mean. The proper use of language is the proper vehicle for the thought. Every distinctive vocation is like a nation; it must necessarily have a language. The literature of every nation depends upon the proper use and the beauty of its language.

Another thing to be considered is the object for which the language is used—the instruction to be given. In our selec-

tion of language and terminology in the different departments we must take into consideration the characteristics of the auditory, and I want to impress the thought upon the minds of the younger men that the best and most substantial language in the world is the direct, the simple language.

Dr. Wm. H. Trueman, Philadelphia, Pa. I know of no one in this country so well qualified to present this subject as the essayist. I suggest that the paper be referred to the National Association of Dental Faculties, with the request that they report at our next meeting their judgment regarding the terms now in dispute. There is no question that many technical expressions need to be more clearly defined, and that convenience and accuracy require the adoption of a fixed, logical standard of dental nomenclature. Those engaged in teaching have this matter constantly before them; they know best which are the most troublesome and ambiguous expressions, and may be trusted to select more acceptable ones. After their report has been received, and a nomenclature agreed upon and recommended by the National body, its general adoption will quickly follow. We can then urge the editors of our journals to adopt the terms and always use them, making all communications sent to them conform to the standard, just as they now insist on standard spelling and standard English.

A few years ago the chemical nomenclature was revised. A little later a formal gathering of newspaper editors agreed to simplify the spelling of many common words, and to eliminate troublesome diphthongs. The changes suggested were reasonable, and were promptly accepted. The first thing is to settle what terms are best, then have the changes sanctioned by some influential body. If the terms are reasonable and logical, they will soon become general; and if the teachers in the schools and the teachers in the journals work together, the reform will quickly be brought about.

Dr. James McManus, Hartford, Conn. I second the suggestion that this paper be referred to the National Association of Dental Faculties for them to take action upon and report at our next meeting.

The motion prevailed.

Dr. Guilford (closing the discussion). I can say very little more than I have already said in the paper without broadening the scope of the subject too much. The main object of language is to convey ideas. Someone has said that words are nothing more than tools. Dr. Crawford remarked that we should use such words as will correctly and intelligently convey the idea to the listener. But there is a difference: we may use words which the man we are speaking to will understand, and yet which will not be understood by people at a distance. For instance, we might speak about a vehicle and give it our peculiar name, and the same word if used in a foreign country would not be understood at all; but if we used such a word as "omnibus" which has a root that all understand, it would probably be comprehended by all. It is not simply the having a tool that will answer our purpose, but having the right one. If I were a carpenter and taught an apprentice to drive nails with a monkey-wrench, he could do it; but if after he had learned his trade he went to work in another shop he would find that he was not using the proper tool. We can drive the nail with a wrench or hammer, but the hammer is the proper tool to use. The scope of language should be as far-reaching as possible, and that is

why in coining a term we should select those words that will be understood by as many nations as possible. They will understand it if we construct the word from Latin or Greek.

A great deal of our nomenclature cannot well be changed. Elimination is a slow process, because words that have become established by usage cannot well be dropped, but if we take care to have them right in the beginning they will not need to be changed. Dentistry is old, while orthodontia is comparatively young.

SECTION I:

Prosthetic Dentistry, Crown and Bridge Work, Orthodontia, Metallurgy, Chemistry, and Allied Subjects.

Chairman—T. P. HINMAN, Atlanta, Ga.
Secretary—J. G. FIFE, Dallas, Tex.

FIRST DAY—Tuesday, July 25th.

THE first meeting of Section I of the National Dental Association was called to order by Dr. Thomas P. Hinman, chairman, on Tuesday afternoon, July 25th, in the Iroquois Hotel, Buffalo, N. Y.

The secretary, Dr. Fife, not being present, Dr. Hinman appointed Dr. J. H. Lorenz of Atlanta, Ga., as secretary *pro tem.*

The first order of business as announced by the chairman was the reading of a paper by Dr. H. H. JOHNSON, Macon, Ga., on "Thoughts on the Development of Crown and Bridge Work: with Some Practical Suggestions," as follows:

Thoughts on the Development of Crown and Bridge Work: with Some Practical Suggestions.

By H. HERBERT JOHNSON.

IN order to refresh our memory and bring to mind a few incidents connected with the development of crown and bridge work, I have deemed it advisable to recite some facts connected with its past history. These statements are not made from memory, nor are they hearsay, but are matters of record, therefore their general correctness can hardly be doubted.

In vol. xvii, page 403, of the *Dental Cosmos* (August 1875), appears an article by Dr. H. C. Register, in which he describes a method of setting an artificial crown by using a vulcanite plate tooth backed with rubber. It was set by first filling the root-canal with a hard-wood peg and afterward putting a threaded gold wire through the hard-rubber backing into the wood post in the root. The crudeness of this operation and the prominence of the essayist leads us to presume that the setting of artificial crowns on the natural roots of teeth had made little progress toward any degree of perfection even as late as that date—1875.

In the November issue of the *Dental Cosmos* of the same year there is an exhaustive idea in crown work by Dr. Theo. F. Chupein, then of Charleston, S. C., read before the Pennsylvania Association of Dental Surgeons. This idea, boiled down, is to fit a gold tube into the enlarged canal by threading one end and screwing it into place, depending on the threaded end to hold it securely. A disk with a split pin is then fitted to the ground surface of the root, and a plate tooth soldered to this, making a sort of modified Richmond crown, but instead of cementing, depending on the spring in this split pin to hold it in place in the previously adjusted gold tube. One advantage claimed was that it could be removed for repairs in case of accident to the porcelain facing.

The discussion which followed the reading of the paper is interesting. Dr. W. H. Trueman advised placing a small bit of cotton in the split pin in order to assist in the spreading and keeping it tight and firm. Dr. E. H. Neall said that there had undoubtedly been great advancement in pivoting teeth in the previous ten years, yet he believed that little improvement had been made, so far as durability was concerned over the old method of wood pivots. The plan mentioned, he said, required very minute work, and was expensive. He had inserted but few pivots for several years, but these had given considerable satisfaction. Professor Buckingham said that he usually used wood pivots. He had used tubes, but seemed to consider it too much trouble. In former times many more roots were pivoted than at that time, and it had been customary to drive the wood pivots with a hammer; this, with the fact of the pivot being too tight, usually gave rise to trouble. In his later practice he forced them up with a notched plugger, putting a little zinc chlorid to fill the interstices. He also used Hill's stopping and in some instances amalgam; in one case he had used amalgam and a silver post. In another case of short bite he had used a cross-pin tooth, which afterward broke. He then made a gold tooth which lasted six years. He had recently extracted seven pivot teeth in one mouth which were firm. Some of them had been worn twenty years. Dr. Wert said that he used very few pivot teeth, finding them too expensive. In making pivots he drilled through hickory wood in the root and inserted a gold wire.

In vol. xxi, page 261, of the *Dental Cosmos* (May 1879), in relating incidents of office practice before the New York Odontological Society, Dr. N. W. Kingsley said: "An interesting operation was performed in my office a day or two since by Dr. Richmond. As it was an excellent case upon which to demonstrate Dr. Richmond's plan, I called him in, and the result was one of the prettiest operations I ever saw." The operation

spoken of consisted in making a Richmond banded crown for the broken-down root of a bicuspid.

Dr. Abbott, in the same meeting, said: "The process which Dr. Kingsley has spoken of I attempted to perform myself not long since. I had made an appointment with my patient, supposing I could readily obtain the services of Dr. Richmond to do the work for me, but was unable to find him." Dr. Abbott varied the operation a little, but made it substantially after Dr. Richmond's banded method. These crowns were all set with zinc oxychlorid, os artificiel, or Hill's stopping.

Dr. Wm. Jarvie, at a subsequent meeting of the New York Odontological Society, in the same year (1879), described a case very much after the style of the porcelain-faced disk crown commonly known as the Morrison crown, except that he did the fitting of the wire posts and disks to a cast previously taken of the mouth, instead of fitting it to the natural root in the mouth as we do now. This crown had no band and was fastened with Hill's stopping (gutta-percha).

Dr. J. N. Crouse, before the American Dental Association at Saratoga in August 1879, commended the process of setting Richmond crowns. He had had the pleasure of seeing two crowns attached together, one root carrying both, and liked it very much.

Dr. G. R. Thomas of Detroit said: "Dr. Richmond's method of fastening gold crowns on roots meets a want which all have felt. I have one in my own mouth, condemned to the forceps previously, but now doing good service."

The well-known Bonwill crown made its advent in the year 1880. An illustrated paper appears in vol. xxii, page 410, of the *Dental Cosmos* (August 1880), by Dr. W. G. A. Bonwill, in which this crown is minutely described.

On page 463 of the same volume is a paper on gold crowns by Dr. Eugene S. Talbot. In this paper he says: "The credit for the suggestion of gold crowns is due to the late Dr. B. Beers, who settled in California in 1849. He received a patent for his invention in 1873. While in San Francisco in the spring of this year (1880), I had the opportunity of examining several crowns inserted by him and which had stood the test of more than seven years of service. Owing to the death of Dr. Beers, in 1874, but little has been done toward bringing this valuable invention to the notice of the profession."

Before the First District Dental Society of the State of New York, in January 1892, in discussing papers on crown work, Dr. E. Parmly Brown makes the statement, which was not refuted, that not one-quarter of the members of the First District Dental Society were at that time furnishing bridges for their patients.

It would be exceedingly interesting to pursue the history and development of crowns further, bringing it right down to the present time, but the limit which has been placed on the length of this paper by the committee will prevent.

From the few historical facts recited we will come very aptly to the conclusion that modern crown work was almost unknown or very crudely performed until sometime after the year 1880, and that bridge work was not in general use as late as January 1892.

In following carefully the development of crown work we deduce the following facts:

That the first methods in use were

bandless crowns, imperfectly adapted to the surface of the root, and held mechanically by either a wood peg or threaded gold wire, or both. The absence of any medium to close up the crevice between the surface of the root and crown usually resulted in failure by chemical disintegration of the root. In all instances where the root was able to resist the ravages of recurrence of decay, and was not split open by the force of biting, the operation was of sufficient permanence to be considered a success. Even a partial success of the crude methods and imperfect materials cannot fail to impart to us a great amount of encouragement.

Then came the advent of the banded crown, which consisted of a band made of gold plate to encircle the entire circumference of the root and driven on tightly, even in many instances being forced up beneath the gum margin far enough to hide the presence of the band entirely. These were held in place by using some plastic material, as cement or gutta-percha, to fill in the interstices to perfect the fit. Great difficulty was experienced in properly preparing roots for the reception of these bands, and equally great difficulty was found in fitting the band so that irritation and inflammation would not result. These banded crowns, however, in conjunction with the all-gold ferrule crowns, made possible that class of work which has proved such a blessing to mankind, *i.e.* the modern bridge. This banding idea at first seemed to embody all the essential features necessary for the restoration of the lost natural crown, but it soon became apparent that while the necessary strength was obtained, the foundation was quickly jeopardized by the excessive inflammation set up, especially on the anterior surface where the gum tissue was thinnest and most susceptible to irritation. Recession of the gum would surely occur within a comparatively short time, leaving an unsightly band of gold exposed to view, and in many instances disclosing a misfit which had heretofore been considered quite perfect.

In casting about for something to take the place of this irritating band and yet give the strength necessary for permanence, various ideas have been suggested, among the first a half-band made of gold plate of about 22 k. and No. 29 gage, that should encircle only the palatal half of the root, with a disk burnished over the ground portion, and extending only to the gingival margin on the labial or buccal side. As the splitting of roots was nearly always caused by the outward force of biting, this gave strength where it was most required. This arrangement was, however, more difficult to make than the whole band, as far as any perfection of fit was concerned, and while the tough gum tissue on the palatal side would stand a great deal of abuse, it also would in due time yield to this severe irritation and recede more or less rapidly.

Then, as a substitute to all the suggestions made and with the sole purpose of overcoming the band with its resultant objections, the Morrison style of crown came into use. The Morrison crown was made without any band at all. It was simply a disk of thin 24-k. gold burnished over the face of the root, with a platinum pin pushed through and soldered, and a porcelain facing attached to this foundation. While this obviated the pain of fitting and the subsequent irritating influences of the band, it had not the strength which was the principal claim for its introduction.

Past experience is fast bringing the

profession to a proper appreciation of the burnishing methods, employing the pliable thin 24-k. gold as the base in all methods for restoring large portions of lost crown tissue. Cast gold fillings or burnished crowns, brought so prominently to our attention and used with such artistic results by Dr. C. L. Alexander of Charlotte, N. C., will in a great many instances completely restore a tooth to its former shape and usefulness without rendering necessary the employment of an encircling irritating band of gold plate, and is always to be preferred when indicated.

Taking advantage of the ease of adjustment and perfect adaptation possible with the burnishing methods before spoken of, I have for some years employed these ideas in all crowns of the porcelain-face class with great satisfaction, and likewise in many of the all-gold telescoping crowns. These suggestions are therefore advanced with a view to overcoming some of the weak points and objectionable features of many of the more modern crown ideas and in the belief that they are thoroughly practical.

FIG. 1.

FIG. 2.

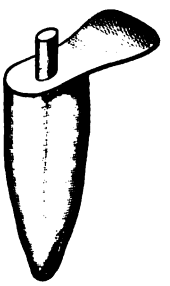


FIG. 3.

FIG. 4.

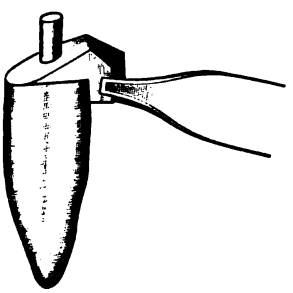
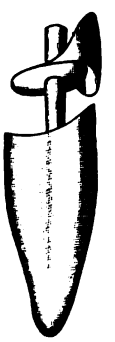


FIG. 5.

FIG. 6.



While the method is not startlingly new, some features of it have not to my knowledge been heretofore illustrated in any publication.

In preparing the root for the reception of this crown it is advisable to leave as much of the palatal portion of the root as the conditions presenting will allow, cutting it very low in front, even a little below the gum margin, as illustrated by Fig. 1. Of course, the remaining enamel must be removed on the pala-

tal side. The canal having been enlarged and a piece of iridio-platinum wire of suitable size and depth adjusted therein, a piece of 24-k. gold rolled very thin, slightly thinner than No. 36 gage, is next selected with which to form the half-cap for the root. This piece of gold is cut wider than the greatest width of the root and considerably longer than the length of the face of the root from before backward, so that when the previously prepared piece of iridio-platinum wire is passed through and soldered, the conditions will be such as is illustrated in Fig. 2. The piece of gold is now burnished at the anterior third of the surface of the root sufficiently to indicate the exact margin, the piece removed, and all surplus cut away at this point, so that there should be no overlapping but just enough of the gold to cover exactly that portion of the face of the root to its margin, as illustrated in Fig. 3.

The approximal sides of the disk are next burnished to these surfaces and also to the extreme palatal portion, with the view of obtaining the half-cap. This burnishing will form some creases or ears at the two approximo-palatal points of the root. With a pair of pliers these creases are drawn tightly together, as shown in Fig. 4. These flaps or creases are then burnished down right and left into close adaptation to the respective surfaces of the root; in fact, all the surfaces are now burnished carefully as shown in Fig. 5. On account of the thinness and pliability of the gold used, these laps can be burnished out completely, and the lapping is not objectionable.

Fig. 7.

Fig. 8.

The formed half-cap is now carefully removed, taking care to prevent a change of shape, and is painted inside with a solution of chalk mixture to prevent the solder from flowing through, and thickened and strengthened by flowing 22-k. gold solder all over the outer surface, as shown in Fig. 6.

This completes the formation of the cap, and the remaining steps are the same as in the making of any porcelain-face crown. The cap is placed on the root, a bite and impression is taken, a model is run, and after placing the whole in a crown articulator a facing is selected, ground, backed, and waxed to the cap now on the model, Fig. 7. The cap and facing are now united with solder, and the crown finished as shown in Fig. 8.

The claims made for the process are—

Strength where needed to bear the strain of the outward force of biting; a cap accurately adapted and adjusted so that only a minimum amount of irritation, if any, will ever arise to cause after trouble. I may say that very thin platinum may also be used instead of the thin gold, where for any reason it may be preferred.

The value of this burnishing method in crown adjustment is very apparent, and it can be varied to suit nearly all cases. The promise of permanence and durability which attends the operation of cementing porcelain inlays, and all work of like character where the interstices to be filled are reduced to the minimum, will lend additional encouragement to this class of crown work. In the future I feel sure that some such methods will be employed entirely, to the exclusion of all irritating bands.

Discussion.

Dr. C. W. Rodgers, Boston, Mass. In discussing this paper of Dr. Johnson's there are one or two little points with reference to the historical development of crown and bridge work that I wish to take exception to, particularly the statement that "crowns and bridges were crudely done up to 1875, and were not in general use as late as 1892," and particularly the last part of that statement. At the Fourth International Dental Congress Dr. Guerini exhibited samples of bridge work made more than two thousand years ago, and I have no doubt that crown and bridge work was practiced to a limited extent throughout the succeeding centuries. The earliest literature of much value was a work published by Pierre Fauchard in 1728, and in it he accurately described methods of crown and bridge work. Of course he was handicapped by not having porcelain at his command. From that time on occasional writers have mentioned methods of crowning teeth, as Robert Wooffendale in 1783, Benjamin James in 1814, and C. F. Delabarre in 1820.

In 1855 a distinct advance was made by Dr. Wm. H. Dwinelle, who published in the *American Journal of Dental Science* for April 1855, page 278, a method of making porcelain-faced crowns. In 1862 Dr. D. B. Wood published in the *Dental Cosmos* an article on "Enameling Plugs and Restoring the Contour of Defective Teeth by the Application of Enamel Caps." This article not only describes porcelain-covered platinum crowns, but also gold crowns and porcelain inlays.

Dr. Wm. H. Morrison, in the *Missouri Dental Journal* for May 1869 describes a gold crown made on a metal die. Other men to make improvements were Dr. C. E. Francis, *Dental Cosmos,* 1876; E. S. Talbot, *ibid.,* 1880.

In January 1887, before the First District Dental Society of New York, Dr. J. Rollo Knapp said: "Probably no single topic in the busy domain of dental art is today receiving so earnest and thoughtful attention of the profession at large as that of crown and bridge work."

In February 1887, before the Odontological Society of Philadelphia, Dr. A. G. Bennett said: "During the past decade there has been rapidly developed what may be properly called a third branch of dentistry. . . . practiced with varying degrees of success and failure, and has been advocated with almost all degrees of knowledge and prejudice. This new system, which is strictly speaking an old system revived and greatly

improved, is called crown and bridge work."

In 1888 in an editorial, Dr. James W. White, at that time editor of the *Dental Cosmos,* said: "At many society gatherings there are now not only exhibited, but constructed and inserted on the spot in the presence of intelligent and eager observers, gold and porcelain crowns and dentures which exemplify in a most practical way an expertness in constructive and manipulative ability worthy of enthusiastic commendation."

In 1887, before the First District Dental Society of New York, Dr. George Evans said: "Unquestionably the most notable artistic advance in dentistry of late years is crown and bridge work. In my judgment this department of our work has reached a stage of development clearly entitling it to rank as a specialty of dentistry."

I think that the foregoing proves that crown and bridge work was in general use during that time, and I feel that a large share of the credit for the development of such work is due to the men who did it between the years 1878 and 1890. If you will look up their work in the literature on the subject, you will find volumes dealing with all the possible phases of crown and bridge work. There are a number of articles written by Dr. W. Storer How, a most prolific writer and one who has given to the profession many good ideas; by Dr. Marshall Webb. and by Dr. Wilbur F. Litch; and a long list of men might be mentioned who have done a great deal toward the development of this phase of prosthetic dentistry.

Let me quote a little more fully from Dr. E. Parmly Brown in the statement referred to by the essayist. In 1892, Dr. E. Parmly Brown, speaking of crowns and bridges, said: "I think I can safely say that while not one-quarter of the members of the First District Dental Society today are furnishing their patients with bridges, there are bright men all over the land, from the Atlantic to the Pacific, from New Orleans to Canada, who are doing it. The other day I was speaking to a member of this society who said: 'Yes, I am making bridges now, and I am making money at it too, as the people will have them.' The people know what advanced dentistry is. He had either to make bridges or lose business." Speaking for himself, Dr. E. Parmly Brown said that in eight years he had put in a thousand cases with but twenty-five failures.

I wished to make these remarks on the subject of crown and bridge work to take exception to what Dr. Johnson said, that they "were not in general use as late as 1892." I feel that great credit is due to the men who worked previously to that time. The improvements made since then have been merely improvements with reference to details.

With reference to Dr. Johnson's illustrations, I think he has presented a valuable method, and a good addition to what we have in the methods of manipulation of crowns as abutments for bridges. I like Dr. M. C. Tracy's method of preparing the root. He says the root is beveled toward the labial and palatal surfaces and also at the approximal sides, leaving a narrow floor at the center of the root. The foundation is swaged in No. 30 gage platinum, which forms a seat of great strength around which to construct the crown. The post is made of iridio-platinum wire, and is allowed to extend below the plate for the attachment of the facing. The crown is contoured with any of the high-fusing bodies and finished with low-fusing porcelain.

Dr. C. J. GRIEVES, Baltimore, Md. Mr. Chairman and gentlemen of the section: Since Dr. Rodgers has covered the historical, I will simply touch on the practical side of the question. After receiving this paper some weeks ago, in order that I might more intelligently discuss it, I made six or eight of these devices, and I have to say that I want to present my compliments to Dr. Johnson or to any man who makes an effort to take the crown out of the laboratory and make it a feature of operative dentistry. This method is one of the few where thin gold is burnished against the tissues, not on a cast of an imperfect impression, but directly against the root, following largely the methods of operative dentistry and on the lines of cast fillings.

I think that crown and bridge work, generally speaking, was from the start unfortunate in having been consigned to the laboratory and labeled mechanical dentistry. I would insist on the idea that the fitting of the band and the adaptation of the cap is operative dentistry—something to be done at the chair. The ready-made crown, the crown and bridge made while you wait, and then stuck in the mouth, are doing crown and bridge work more harm than anything else today.

The discussion of the practical side of this paper resolves itself into bands fitted cervically, because the essayist is trying here to do away with bands, in favor of plates of metal thin or otherwise, swaged or burnished directly to the root-surface. Now, there can be no difference between irritation produced in the gingival tissues by a metal band extending vertically along the long axis of the tooth, and that by one extending laterally. Both produce gingivitis if badly done, and both will succeed if done correctly. The great fault with the band lies in the fact that it is hurriedly adapted, sufficient time not being allowed for the teasing back of the gingival tissues. The gold band is fitted and the root prepared with as much care as is ordinarily applied to cavity preparation, but the adaptation of the band to the root is not carried out with the same amount of care.

If, for instance, the time spent on the band were given to shaping the root walls, pushing back the gingival margins, as much tissue as possible being exposed, so that we may not be fitting the band in the dark, the results with the band would be quite as satisfactory and pleasing, and I think much more substantial. A very prominent porcelain worker, speaking of bands, said that the fitting of the band under the gum was much like a man drawing a pig with his eyes shut. I venture to say that the gentleman never, except by chance, made a band intelligently where he had not first pushed back the gingival tissues, and we need not expect success unless we do that, any more than in a large filling cervically seated where the soft tissues are not forced away from the cavity.

Personally, in regard to crowns, I prefer the sentiment voiced not long ago in a meeting where the speaker said that it was quite a reflection on the dental profession if, after twenty-five years' use of the banded crowns, they could not fit a band to the root of a tooth without serious sequelæ to the gingival tissues, when for years the general surgeon has been placing silver plates after brain surgery. This appliance is beautiful where the tissue has receded labially, but for practical crown and bridge work I am not ready to say good-by to the band. We should be a little more consistent in condemning bands, for the band fitted pos-

teriorly can do just as much harm to the tissues as the band fitted anteriorly, and there are those who denounce all bands, being ready to say that they eschew the making of all jackets, shells, etc., and who place their dependence for mechanical support posteriorly on the root, plates, and posts in crown and bridge work. Then and only then will they be honest in condemning bands.

In making these appliances I have in some cases met with fair results, and in others not so good, but I attribute that to my faulty technique, and I wish Dr. Johnson were here to enlighten us on one or two points. One or two things happened to me: In the first place it was not so easy to adjust the pure gold to that projecting hump on the palatal side as it seems to appear from the drawing, and after fitting the cap and flowing the solder, I found little inequalities in the solder, which, being thinner than the other parts, split in forcing the cap into position, and may have been due to my defective skill in burnishing. Again, in using the crown as an abutment in a bridge, it was found very difficult in soldering to keep the solder from flowing from the cap toward the mass in the bridge, which was naturally the hottest, and when the bridge was taken out of the fire there was nothing left on the cap but the thin, pure gold.

Now, I compliment Dr. Johnson on giving us a new idea, and I trust it will be developed, particularly the adaptation of the thin gold to the root simulating the cast filling of Dr. Alexander's, and along the lines of operative dentistry generally. I think these crowns have their place, but I repeat that I am not ready to part with the banded crown in bridge work, for I believe the difficulty with the band is corrected by pushing back the gingival tissues and making a half-banded crown, adapting the pure gold directly to the root and reinforcing it with solder to cervical contour, and I hope we may yet come to some such method in crown and bridge work.

Dr. C. Carroll, Buffalo. The essayist said nothing in his paper as to whether he tips the backings of his teeth with gold, but I would like to ask him if he does it, and if not, whether he has any difficulty with broken-off facings?

Dr. R. M. Sanger, East Orange, N. J. Of course I cannot discuss Dr. Johnson's particular method, as I have never made a crown after his method. I devised a half-collar crown embodying some probable advantages over the full-banded crown, constructed with No. 32-gage gold and I think having some advantages over this crown in the ease of making and the ease of adaptation. In my opinion the half-collar crown properly constructed and made has advantages over the full-collar crown in its esthetic points—the concealment of the gold which to my mind is a decided advantage—while I think the half-collar properly fitted will give all the strength that the full-collar crown will give. I think our error in using the full-collar crown is in attempting to make the collars too deep. It is a mistake in my opinion to suppose that a collar of one-thirty-second of an inch in width is not as strong as the collar one-sixteenth of an inch in width. If the band encircles the root, I do not think the depth is essential, providing it goes far enough under the gum to give it the proper hold. It is in my opinion a mistake to think that the deeper the collar the better the crown will be. Again, the half-collar crown has an advantage in bridge attachments in that it gives an esthetic effect. It gives the same appear-

ance as the all-porcelain crown, and at the same time it has a gold back to which other teeth can be attached. This cannot be done so readily with the porcelain crown unless it be in the case of an all-porcelain bridge.

In the matter of the history, I would like to say one word with regard to Dr. E. Parmly Brown. The essayist passed over this portion very briefly, but I have always thought that to him was due the credit for devising the all-porcelain bridge, and indeed I do not think Dr. Brown's method for constructing that bridge has been improved upon to any marked degree. I want to pay him that tribute, because I know that he is a very skilful man and is doing a great deal of good work along that line.

In regard to the tipping of the teeth with gold, I have not found that a necessity, if proper attention be paid to the occlusion. I have not been in the habit of putting these tips on porcelain crowns, and I do not think that I have a greater number of split facings than the men who tip their facings.

Dr. W. G. MASON, Tampa, Fla. I have made one crown after Dr. Johnson's idea. I had to crown a lateral incisor which had broken, splitting off a part of the root under the gum margin on the lateral surface, making it next to impossible to use a band. While I did not follow Dr. Johnson's idea exactly, it was virtually the same thing. After preparing the root, I burnished a piece of platinum over the end of it, allowed it to extend over the palatal surface, and burnished it well down around the root, just under the gum margin. The pin was then placed on the root, the cap was reburnished, the matrix reinforced with solder, and the crown finished in the usual way. I am much pleased with the crown, and think the idea is a capital one.

Dr. R. M. SANGER. Dr. Grieves has asked me to speak of the method of fitting bands which I followed for a number of years; that is, the dissecting away of the gingivæ where I found it closely attached. It has been my practice to take the scalpel and under cocain to dissect away the tissue around the root to the depth of the band. The tissues are then cauterized with trichloracetic acid, thus causing a clean, dry eschar which forms practically a new attachment to the gum, and does away with all possible source of irritation.

The subject was on motion passed, Dr. Johnson not being present to close the discussion.

The next order of business as announced by the chairman was a paper by Dr. HAROLD DEWITT CROSS, Boston, Mass., on "Normal Articulation of Artificial Teeth," as follows:

Normal Articulation of Artificial Teeth.

By HAROLD DEWITT CROSS.

THE purpose of this paper is to very briefly describe normal or anatomical articulation—which, in a word, is duplicating in artificial teeth certain conditions present in the arrangement of the natural organs. In this artificial normal arrangement there is no feature which is not a copy of the natural teeth,

either in the shape of the individual teeth, or in their relations one to the other.

The features of the natural teeth which should be copied in making a normal arrangement of artificial ones are: the compensating curve; the sharp cusps and deep fissures; the inclination of the molars; the low palatal and high buccal cusps of the molars, and a normal occlusion. The compensating curve is for the purpose of equalizing the articulation during the forward and lateral motions of the mandible, when the condyles move forward and ride on the articular eminence. This permits of a balance on the passive side and is needed because the condyle path is at an angle to the plane of occlusion. The sharp cusps pass more readily through tough foods, hold the food, and permit of a proper overbite of the anterior teeth.

The inclination of the molars and the long inferior buccal and superior palatal cusps assist in balancing the articulation, and permit of direct force being applied during the lateral masticating motion. The location of the fissures and the arrangement of a sharp and blunt cusp oppositely set in the maxilla and mandible, provides for a sharp one bearing on a blunt one during mastication. The normal occlusion, which is so essential, is a summing-up of all that goes to make a normal articulation, and if the occlusion be correct in every detail the articulation will also be right.

The terms occlusion and articulation should be understood thoroughly, as they are frequently used synonomously. Occlusion signifies rest, a passive condition when the condyles are in their sockets and the teeth locked by the bite, the upper third molars being in contact with only one opposing tooth, and the lower incisors underbiting but not in contact with the upper. Articulation, on the contrary, expresses motion and is an active condition. It includes all the positions which the teeth may assume during any of the movements of the mandible. The state of occlusion requires no further description, but it will be necessary to describe the articulation more in detail. The usual motion during mastication is a lateral grinding one. The condyle on the active side—or that in which mastication is being carried out—rests and rotates or moves forward very slightly, while the one on the passive side glides forward on to the eminence. This brings the teeth on the active side into contact, the lower buccal with the upper buccal cusps, and the lingual likewise, so that there is contact of every cusp of the molars and bicuspids on the active side. This contact may extend forward as far as the incisors in cases where there is very little overbite. The passive or balancing side has only one point of contact, and that is between the buccal cusps of the lower first and the palatal cusp of the upper second molar. When the teeth are in the incising position the condyles are both forward on the eminence, and there is contact between the buccal cusps of the molars and also of the incisors.

To set up teeth to a normal occlusion and articulation, it is essential that an articulator be used which accurately reproduces the movements of the mandible; also that some provision be made to adjust the casts on it so that they may bear the proper relation not only to each other, but also to the condyles and to the path of the condyle. Teeth set up in an articulator, properly adjusted, will occlude and articulate in the mouth just as on the articulator.

By the use of the face-bow one may secure the exact relation of the plates to the condyles and their path for transference to the anatomical articulator. This has nothing to do with the taking of the occlusion, which is previously done in the usual manner. In setting up the teeth the upper should be first put in place, beginning at the median line, then the lower second bicuspids and molars alternately on each side, and lastly the first bicuspids, canines, and incisors. This order secures a correct occlusion even if the teeth are not properly matched in the set, and trying the articulation as each tooth is put in place insures the normal articulation. Nearly all sets of twenty-eights as put up by the manufacturer are improperly matched the lower with the upper, and as many are made for a very short or edge-to-edge bite, it is frequently necessary to narrow the lower incisors in order to get them in place. A careful selection may avoid this in many instances.

Usually it is best to select teeth with a fairly long bite, as the natural teeth have a normal overbite of about one-eighth of an inch. Before setting up any of the teeth, a deep square fissure should be ground in each bicuspid and molar, excepting the lower first bicuspid; the fissure should be near the buccal side in the upper and near the lingual side in the lower. This can best be done with a carborundum wheel of three inches in diameter and one-half inch in thickness. If it be desired to put in the transverse fissures, they may be made to some degree of accuracy by means of small thin engine stones. This method of arranging the teeth applies not only to entire upper and lower plates, but also to single and partial dentures. For partials it is not always possible to obtain an absolutely normal articulation in every particular, owing to an original faulty occlusion or to changes due to extraction, but it is possible and practical to employ the sharp cusps and to obtain a good masticating contact on one side, and some sort of a balance on the other, even in very unpromising cases.

Teeth arranged on these principles will cut, hold, and grind food very much better than the old style of smooth cusps, and permit one to masticate his food almost as readily as with the natural teeth. Of course it is essential that the plates fit the mouth just as well as possible, otherwise there will be no advantage in securing a normal arrangement. Normal articulation is not devised because dentures are not or cannot be made to fit, but the essential idea is to make the substitute for the natural organs as nearly like them as possible, and to permit of the natural use of the mandible in its lateral movements, which is an impossibility when the old hinge articulators are used.

It is impossible for one to wear teeth having deep fissures arranged in a plane-line or hinge articulator, because the long cusps will catch and interlock in such a manner as to dislodge the plate immediately. This is probably the reason why the artificial teeth are now made without cusps, the latter being substituted by little smooth hunches which cannot catch, and which are not of the slightest value in masticating.

With dentures made with a normal articulation one is able to incise or to masticate any ordinary food with no liability of the plates being dislodged, as there is a contact of at least three points in any position of the mandible during incising or masticating. Of course, if one attempt to bite a lead pencil or other sim-

ilarly hard substance, there can be no balancing contact, and all that will prevent the denture from tipping will be its fit, and for this particular purpose normal articulation is no better than the plane-line arrangement. But with articles of food it is different, for even substances like tough meats are quickly pierced by the sharp cusps, and portions of the food are pressed into the deep fissures and interspaces, allowing of an almost instant contact of the cusps, giving a balance, and after contact is once established there can be no tipping, as the contact continues till the teeth are in occlusion.

The path of the condyle has been found to be normally about thirty degrees, although there is considerable variation in different individuals. This has been determined practically by measurements and tracings on the outside of the face. Theoretically, in the perfectly normal condition, the path of the condyle will follow a line starting at the highest point of the condyle and cutting the articular eminence at its lowest point. This line will also pass through the cutting edges of both the lower and upper incisors. This principle is made use of in setting the casts in the articulator, and gives a slightly varying angle for each case. The direction of the slot in the articulator represents the path of the condyle, and the casts should be set so that the prolongation of this slot will pass through the portion of the wax of the occlusion plates which will be later occupied by the cutting edges of the lower and upper central incisors.

One of the advantages to be derived from the use of the face-bow articulator is that the casts when they are set on the articulator are hinged on the same radius that the mandible is, with the result that if the bite is opened or closed the relations existing between the two casts remains the same.

In setting up teeth to a normal articulation, one must to a certain extent estimate the compensating curve, because there is no very practical manner of absolutely determining it. Theoretically, however, the angle of the condyle path determines the overbite and front bite; while the overbite, in turn, determines the compensating curve and the length of the cusps. Thus, with a considerable angle of the condyle path and a long overbite there must be quite a distinct compensating curve, deep fissures, and considerable of a front bite, while there might be present in another case the same angle of the condyle path with only a slight overbite, very little front bite, and but slight compensating curve. The angle of the condyle path, the overbite, front bite, and compensating curve are all closely related and dependent on one another, so that one soon learns from experience just what amount to give to each.

Discussion.

Dr. C. W. Rodgers, Boston, Mass. Dr. Cross read a paper before the Massachusetts State Society in which he reported some very interesting experiments carried on by him with several plates with artificial teeth attached. Dr. Cross made full upper and crown plates, using the ordinary articulator, for a gentleman who was at the time a student in medicine. The gentleman wore the plates for several years, and Dr. Cross then made him full upper and lower plates, using the face-bow and anatomical articulator, setting up the teeth with the compensating curve. This gentleman, being a student of medicine, became very much

interested in the masticatory value of the new plates, and he performed a number of experiments with them as compared with the old. He found in using the new plates that he was able to crush such foods as peanuts, Scotch bread (being of Scotch descent he liked what is called the Scotch loaf), etc., masticate them thoroughly, and get them ready for swallowing with a less number of chews than were necessary with the old plates. This proved the great value of artificial teeth when set up with the assistance of the anatomical articulator.

The question then arose as to the value of smooth grinding surfaces as compared with the deep sulci and long cusps; whether the teeth set up on the anatomical articulator, using a smooth surface, would not be better for grinding than the deep sulci and long cusps. Dr. Cross then took the trouble to make another set of plates using the smooth grinding surfaces. Experiments were performed with these teeth to test the masticatory value, but it was found that the long cusps were much better for masticating foods.

The gentleman for whom the plates were made, and who is now a medical practitioner, has become very much impressed with the value of artificial teeth set up by this advanced method which the essayist advocates. I think Dr. Cross is doing a great deal of good work, and coming in contact, as he does, with so many young students, he has the opportunity of thoroughly teaching them the value of setting up the teeth so as to get the best possible results, and this in time will be of great benefit to our profession.

Dr. G. H. Wilson, Cleveland, Ohio. Any effort in the direction of improving the articulation of artificial dentures is commendable, and must result in good.

Do we appreciate the conditions that must be met in articulating artificial teeth? The patient necessarily applies force against the artificial plate at angles different from what he would with his natural teeth. This is because we have a changed relation of the relative position of the maxilla and mandible as the result of resorption of the alveolar processes. We find in nature that in ninety-five per cent. of all cases the buccal cusps and incisive edges overlap the lower teeth; and when the mouth is forcibly closed the force acts in the direction of the long axis of the bicuspids and molars and not laterally. So far as holding the natural teeth in place, in simple occlusion, no matter how great the force the roots are not necessary, because the crowns set directly over the alveolar processes—that is, upon the fulcrum—and there is no leverage to displace them. When the teeth have been extracted and resorption is complete there is a great change in the relation of the fulcra—that is, the summits of the alveolar processes. When the resorption is complete we find that there is a considerably greater distance between the summits of the alveolar ridge of the mandible in the location of the second molars because the process recedes downward and outward. In the maxilla the process recedes upward and inward. In view of these conditions, if we set the artificial teeth directly over the summit of the alveolar ridges we will have the buccal cusps of the upper teeth setting inside of the buccal cusps of the lower teeth. For this reason we have so many and varied mechanical problems to solve.

It seems to me that because of these changed conditions and the laws of leverage that must be considered, we do not and cannot reproduce the exact anatom-

ical articulation as nature designed it for the individual. I doubt if any of us sets the artificial teeth exactly in the position occupied by the natural ones, but we modify our so-called anatomical arrangement according to the existing conditions, thereby demonstrating our appreciation of the scientific requirements of the case in hand.

There is no question that the face-bow is a valuable instrument in teaching and demonstrating certain principles, but I doubt the necessity of its use where the lessons have been well learned.

The matter of deep cusps is a little overdrawn, it seems to me.

There is no question in my mind but that the more we study anatomical relations and articulation, the better workmen we shall become.

Dr. N. S. Hoff, Ann Arbor, Mich. I am very much interested in the subject of the occlusion of the teeth, and I think there is nothing in the construction of artificial dentures in which we are so lame as in the matter of the proper occlusion of the teeth. I have had this subject brought very forcibly to my notice in the study that I have been giving to orthodontia—the importance of occlusion both in orthodontia and otherwise—and I believe it is only now that we are waking up to the importance of this subject. It is surprising to one making a study of orthodontia to know the number of cases of malocclusion that one encounters in daily practice. There is hardly one case in a dozen, and perhaps I might say one case in fifty, where the teeth are in perfect occlusal relation to each other. When we find that conditions are as enumerated, and further, that people with dentures in malocclusion are very successful in the mastication of their food, we possibly are led to think that we can carry the same ideas into artificial dentures, but here we encounter such conditions as Dr. Wilson referred to in his remarks, conditions dissimilar from what occurs in the case of natural dentures. We cannot expect to secure suction or adhesion of the artificial dentures to the supporting tissues sufficient to justify us in neglecting the matter of the function of occlusion as related to the question of artificial dentures.

We do not give sufficient attention to the subject of obtaining the proper relation of the jaws. We will have to study the problem of the proper relations of the jaws in order to secure an occlusion not only as near as possible to the natural occlusion, but likewise to produce a harmonious result. It should be the part of the prosthodontist to secure harmony, and also to set the teeth in such relations that the patient will be best enabled to use them in the mastication of food. If we should make as careful a study of the occlusion of the artificial teeth as Dr. Angle has done of the natural teeth, we might establish some definite rules on the construction of artificial dentures, and we shall have made a great advance in the study of prosthetic dentistry. This is a subject which it seems to me needs to be studied more carefully than any other subject in the realm of prosthodontia. We blame the manufacturers for the faulty occlusion of their artificial teeth, but I believe it is more often the fault of the dentist rather than that of the manufacturer. These teeth come to us in fairly good condition, but need to be manipulated before an ideal result can be secured.

Dr. M. T. Watson, Detroit, Mich. Dr. Hoff's remarks a moment ago, in speaking of occlusion in relation to orthodontia, brought this thought to me—that

practitioners who are doing prosthetic work are called upon to do even finer work, for you have to produce the finished occlusion with every tooth perfectly "seated," as the mechanic would express it. If you fail in this and allow a single tooth to strike too hard, the fit and usefulness of your plate is destroyed. In orthodontia we must establish the normal relations mesio-distally and bucco-lingually, but the fact that a tooth has been slightly elongated or that it is not quite long enough is a source of little concern to us, as the natural forces usually take care of such a condition.

Dr. G. H. WILSON. Dr. Hoff's remarks brought the thought to my mind that we rarely have normal conditions to restore. There are two reasons for this: first, because the early extraction of one tooth or more, interferes with the normal development of the jaws; and second, because diseased conditions of the mouth in later life may have produced marked changes in the arrangement of the teeth and contiguous structures, so much so that the patient and friends may often have an erroneous idea of the natural or normal.

It is the prosthetist's duty to form a conception of how nature intended the dental organs to be, to know what the acquired features were, and then to harmonize the artificial denture with its environments.

We can learn much from our orthodontist friends.

Dr. CROSS (closing the discussion). The feature of leverage of artificial dentures has been spoken of; namely, that if the teeth are set on the ridge the occlusion would not be normal, but would bring about opposite conditions, the upper striking inside the lower, and if placed in normal occlusion the teeth would be outside the ridge. I find that such an obstacle is very readily overcome by following, as in all branches of this work, the conditions of the natural teeth. In the natural teeth the bicuspids somewhat and the molars to quite an extent tip outward—the condition which I designated in the paper as the inclination of the molars. There is an inward sweep from the lingual aspect of the lower first or second molar, and a line drawn from that will not touch the gum tissue. The lower molars are inclined lingually, and the upper molars buccally, and if that same condition be preserved in making artificial dentures the occlusion will be normal, and if these teeth are set over the ridge the direction of the force in mastication will be along the long axis of both of these teeth. I follow out the idea of setting the teeth over the ridge, even including the lower incisors, and when carrying out this idea a very marked underbite, a front bite, or whatever may be desired can thus be obtained. There is quite a distinct space naturally between the lower and upper incisors.

In regard to the grinding of deep fissures in teeth, I did not wish to be understood as carrying it to an extreme, yet I believe in deep fissures and sharp cusps. If you will take a cast of an upper set of natural teeth, and look at the teeth, inverting the cast so that the teeth will be projecting upward, and "sight" along the fissures of the molars, in almost every case except where the cusps are worn down greatly, I think you will be surprised at the depth of the fissures and the sharpness of the cusps. I believe in sharp fissures and sharp cusps, because with artificial dentures we have less force to apply than in the natural teeth. The force is greatly lessened; it is brought

down perhaps from two hundred pounds of available force in the natural teeth to possibly forty pounds in the artificial teeth, and we want in a measure to compensate for that loss in the artificial teeth.

In addition to that there is the question of the instability of dentures—and unless the teeth have fairly sharp cusps we cannot restore the function of mastication to the extent possible. I believe of course in aging the anterior teeth to suit the individual cases, and I do believe in getting sharp cusps for mastication. If one were to put new teeth in a coffee mill, he would put in good sharp teeth and not smooth ones.

In regard to the manufacturers, while there is yet room for improvement in the manufacture of artificial teeth, those which are obtainable at present are better than we sometimes think, and it lies wholly with the dentist whether there shall be any improvement made or not. For the last year or so I have been in communication with the representative of one of the largest manufacturing concerns in the country, and while he admitted that it would be convenient to have teeth made according to natural molds, he simply says that there is not a sufficient demand for them. He said also that when a demand is created for such teeth the manufacturers will supply them, as they were in business for financial reasons, but at present they had to make teeth of the kind that the majority of dentists use.

One of the speakers expressed in different words Dr. Bonwill's idea when he made the statement that "he could articulate the teeth better than God Almighty." It is necessary for the artificial teeth to be better articulated than the natural teeth, because of the adverse circumstances under which they are to be used.

Another speaker brought out the idea of orthodontia in regard to the articulation of artificial teeth, and in replying to him my remarks will apply also to the statement by Dr. Wilson, that because of the jaws being undeveloped it is very nearly impossible that the artificial teeth should restore the natural conditions. Now, I believe this to be possible, and the work of the orthodontist goes a good way toward proving that such a thing is not only possible but feasible. They take undeveloped jaws and restore them to natural conditions, and therefore I believe that it is possible to reproduce almost the normal conditions in all cases requiring artificial dentures.

On motion the subject was passed and the meeting adjourned until the evening session, at 8 o'clock.

FIRST DAY—Evening Session.

Section I was called to order at 8 o'clock Tuesday evening, July 25th, by the chairman of the section, Dr. T. P. Hinman.

The first order of business was the reading of a paper by Dr. CALVIN S. CASE, Chicago, Ill., on "Open- and Close-Bite Malocclusion," as follows:

Open- and Close-Bite Malocclusion.

By CALVIN S. CASE.

OPEN-BITE MALOCCLUSION.

In the malocclusion which is characterized by an open bite, the front teeth are apart or open when the jaws are closed in an effort to masticate food. This character of malocclusion varies in its scope, from conditions in which only the second molars occlude, with the front teeth widely apart, to conditions in which all of the buccal teeth quite perfectly occlude, with the front teeth but slightly apart. A few typical characters of open-bite malocclusion are shown in Fig. 1. The impressions for these models were taken by pressing modeling compound against the teeth while the jaws were in masticating closure.

Occasionally the condition obtains far more upon one side than the other. Usually, however, the space between the upper and lower teeth quite uniformly increases from the point of occlusion toward the front, just as if the mandible had been bent downward or straightened at the angles of the rami. In fact, in pronounced cases where two or more teeth on each side occlude, the back ones will at times seem to have been driven into their sockets through the force of mastication, or prevented from growing to their full height, so that the tuberosities come into close proximity to the angles of the rami when the jaws are closed. The writer has met with a number of cases (however, older than twenty-five years) for which the entire forces of mastication had been sustained by single molars on each side, and with no apparent intrusion of these teeth. While there are doubtless certain isolated cases of open-bite malocclusion caused from direct inheritance or the inheritance of syphilitic taint, and even from thumb and tongue-sucking, etc., these are not the typical open-bite occlusions to which the writer refers.

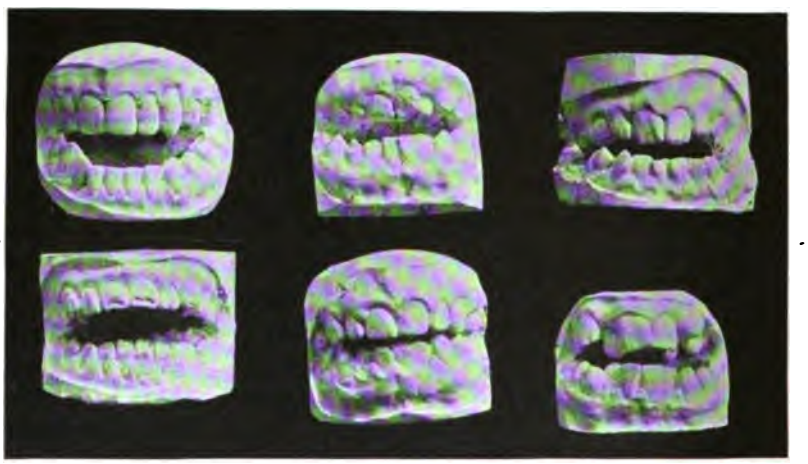
The principal if not the only cause of the typical form of open-bite malocclusion—in the writer's opinion—is long-continued mouth-breathing during the early years of childhood development. The common local causes of early mouth-breathing are enlarged tonsils, adenoid vegetations, or any of the diseases of the naso-pharyngeal passage which obstruct free breathing. The indulgence of mouth-breathing may arise from an acquired or inherited habit without discernible abnormal conditions of the nasal tract; and again with a partial stenosis that obstructs free breathing yet one in which the mucous membrane is perfectly healthy. The habit quite commonly obtains with many people during sleep, who through a lifetime of this indulgence (or necessity) do not experience any physical ill-effects from it.

In the writer's opinion the *modus operandi* in the production of open-bite malocclusion from this habit is purely due to mechanical action of the muscles in holding the mouth open to breathe more freely. And as the action takes place principally during the involuntary activities of sleep, the mouth is usually gaped widely open. The mandible, with condyles resting in the glenoid fossæ as

fulcrums, is pulled downward and held open by the hyoid muscles attached beneath the chin. Opposed to this force is the lifting action, principally of the masseter and internal pterygoid, at near the angles of the rami and body. These forces acting upon an undeveloped mandible during the early years of its immaturity in form will tend to straighten it, or, more correctly speaking, will prevent the rami from fully assuming their natural approach to a right angle with the body, thus causing the back teeth to occlude while the front teeth are more or less apart.* To more fully illustrate this proposition, glance at Fig. 2, which was taken from "Gray's Anatomy" and is intended to show the relative size and shape of the mandible at birth, puberty, and adult development, during which time the relation of the rami to the body changes from a decidedly obtuse to nearly a right angle.

From four to twelve years of age, when mouth-breathing from adenoid vegetations is quite common, the undeveloped quality of bone renders it quite susceptible of change in the form of its natural growth under the influence of slight but continued abnormal pressure. Fig. 3 is made from one of Dr. Cryer's illustrations of normal occlusion. In the picture shown on the right a portion of the mandible was removed, cut at the angle, and replaced in the position it might assume under slight continued force exerted during childhood in the direction of the arrows by the muscles while holding the jaws wide apart.

Fig. 1.



In many cases the relations of the rami and body may be seen from a profile view of the face to stand at a more obtuse angle than is normal—and with the frequent production of prognathism—both of which are well shown in Figs. 4 and 6.

I would ask anyone who doubts that mouth-breathing is the cause of the com-

* This theory of the cause of open-bite occlusion was presented by the writer in a paper read before the Odontological Society of Chicago in March 1894, and published in the *Dental Review*. (See that journal for July 1894, page 511.)

mon open-bite malocclusion so frequently seen, to inquire in any case of typical open-bite whether the subject does not, or did not during childhood, sleep with the mouth open. If a negative reply be received, it will be because the observer's attention has not been called to it before, or because the subject has long recovered from the cause and the practice, and has forgotten.

While open-bite malocclusion may occur in connection with any compatible malposition of the teeth—for the same reason that children of all varieties of physiognomies may have conditions of the naso-pharyngeal tract which obstruct free breathing—in the experience of the writer it occurs far more frequently with that class of malocclusions which is characterized by a retruded upper and protruded lower.

When one considers the natural action of the causes which produce this character of open bite, this is readily accounted for. Any of the diseases which obstruct the normal development of the maxilla frequently result in a retrusion of the intermaxillary process and contained incisor teeth. Again, the concomitant mouth-breathing necessity which produces the open bite by causing the angles of the body and rami to become more obtuse, increases the distance from the point of the chin to the condyles, with a tendency to carry all of the lower teeth forward of their normal occlusion and dento-facial relations. If this forward movement of the mandible be sufficient to carry the points of the occluding cusps slightly forward of their normal inter-

Fig. 2.

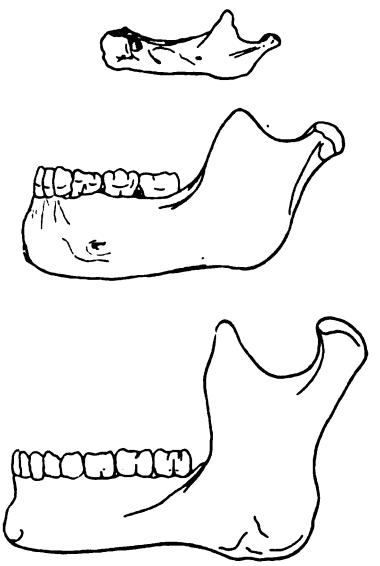


Fig. 3.

digitation, the forces of mastication, acting upon the inclined facets, will tend toward a further protruding movement of the lower teeth and a retrusion of the upper.

If this explanation be true, it will at once be seen that the above mal-relation of the upper and lower teeth may be wholly produced by any of the diseases which may obstruct natural breathing

FIG. 4.

FIG. 5.

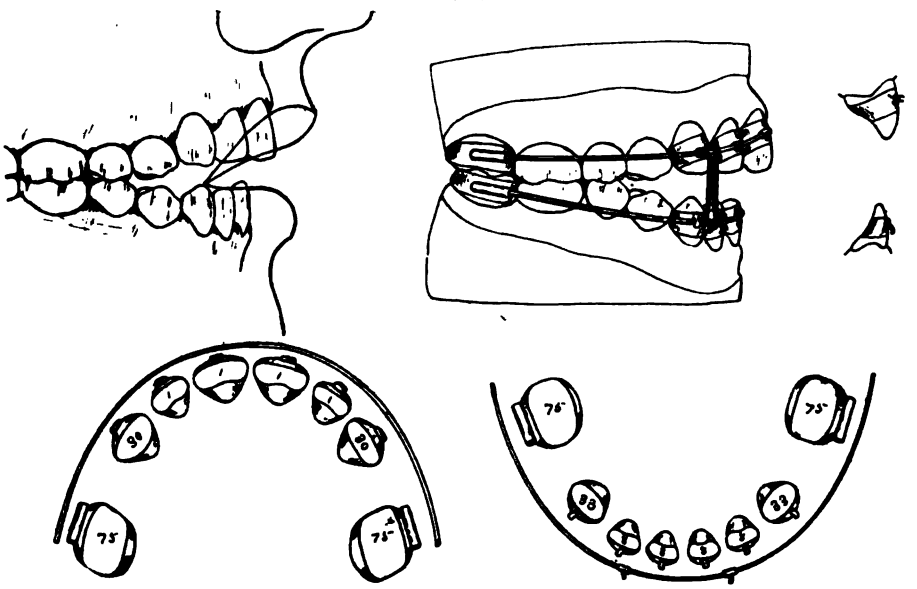
FIG. 6.

through the nose during childhood, and upon any patient whose occlusion would have been otherwise normal. This also accounts for the probable fact that open-bite malocclusion occurs more frequently in connection with an undeveloped and retruded maxilla and a more or less prognathic mandible.

Inasmuch as mouth-breathing during childhood may also occur in connection with any of the inherent dento-facial malformations and irregularities of the teeth, we find open-bite malocclusions also occurring in every class of dento-facial irregularities; though if the mal-relation due to mouth-breathing is pronounced it is reasonable to suppose that the force of its action will have changed to that extent the inherent character of the irregularity.

In those cases of open-bite malocclusion in which the antero-posterior relation of the upper and lower jaws and teeth are normal, the cause or causes which induced the mouth-breathing habit were probably not of a nature to obstruct the growth development of the maxilla. And, while the natural distance from the condyles to the point of the chin may have been increased in the mandible, it was not sufficient to carry the lower teeth materially in front of a normal occlusion. Again, it may have been a case in which the natural occlusion of the lower buccal teeth was distal to normal in relation to the uppers.

FIG. 7.



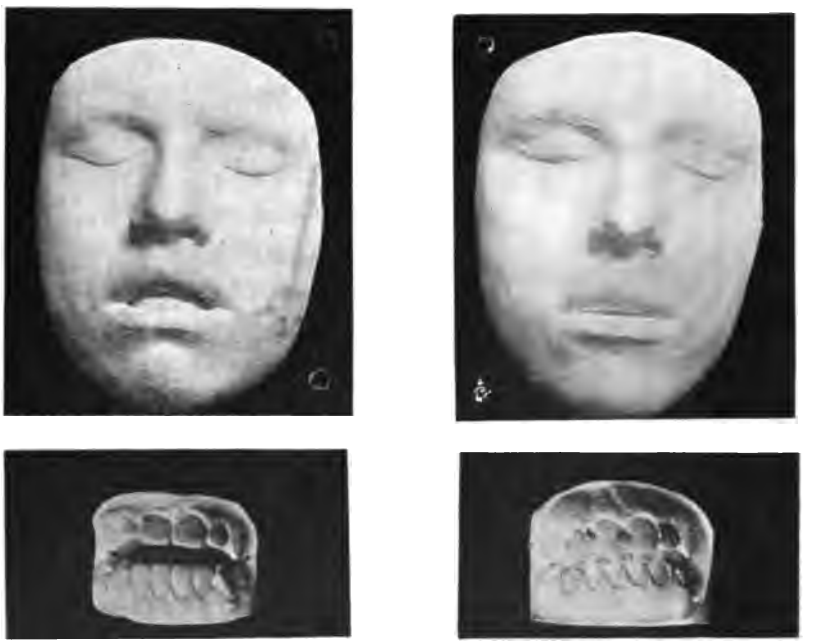
As open-bite malocclusion is seen to occur with only a comparatively few of the people who have indulged in the habit of mouth-breathing, the question will naturally arise: If this be the cause of the typical open-bite, why is it not manifested in every case of mouth-breathing?

I can only answer this by saying that in holding the mouth open the muscles undoubtedly do not exert the requisite degree or quality of stress upon the man-

dible to obstruct its proper growth development.

We certainly find that mouth-breathing without open-bite malocclusion is quite prevalent from the aforesaid causes in many cases of upper protrusions characterized by a high and narrow dome. And though these cases at times

Fig. 8.

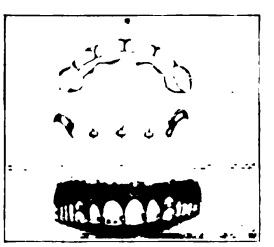


—without, and even with an open-bite malocclusion—will appear as if the forward growth of the mandible had been obstructed, characterized by a receding chin as in certain forms of degenerates, I do not see that that vitiates the theory that the principal if not the only cause of the typical open-bite malocclusion is due to the action of the muscles, as described, in holding the jaws widely apart during the developing stage of the mandible.

In the treatment of open-bite malocclusion, it is the writer's practice to correct the malocclusion partly by grinding the occluding buccal teeth and partly by extruding the labial teeth. Other complications, such as mal-alignments, protrusions, retrusions, disto-mesial malocclusions, etc., are treated the same as in other cases.

I prefer to correct the open-bite feature of the malocclusion more by a free grinding of the occluding surfaces of

Fig. 9.



the buccal teeth, even to sacrificing the vitality of a molar on each side, than by

extruding the labial teeth, because in the latter movement they are the most difficult of cases to retain. Moreover, the shortness of the lips in relation to the teeth, especially the upper, is frequently such as to preclude an extensive extrusion of the upper incisors.

When the malposition is not extensive, however, the labial teeth may be brought to their proper occluding plane principally by an extruding movement. In readily removed during eating and reattached by the patient.

The principal difficulty in this class of irregularities is in retaining the positions of the mechanically extruded teeth, (1) because of the great tendency of the teeth to return to their former malposition, and (2) because of the difficulty in obtaining a retaining base of sufficient stability to combat the direction of the reacting forces toward intrusion.

FIG. 10.

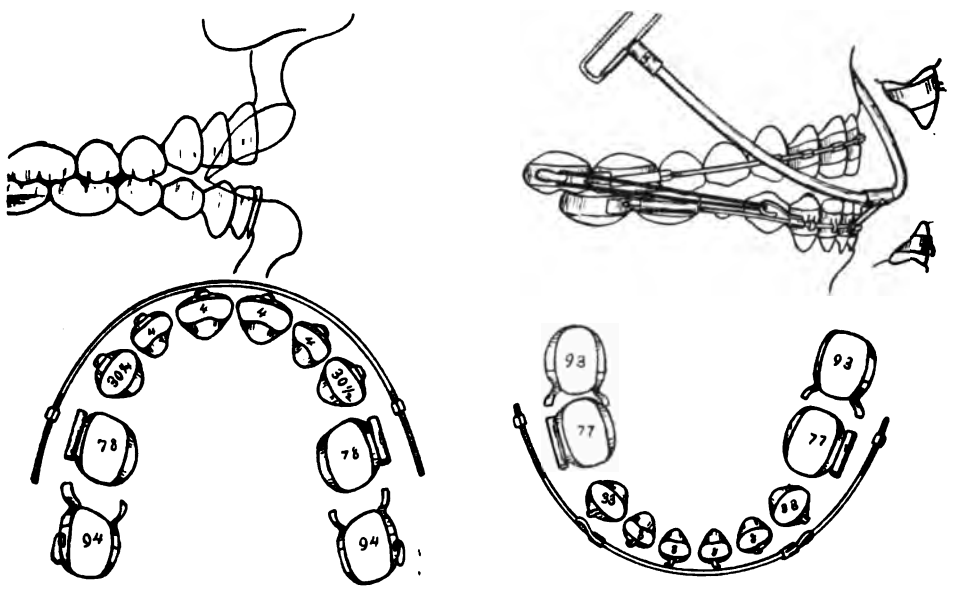


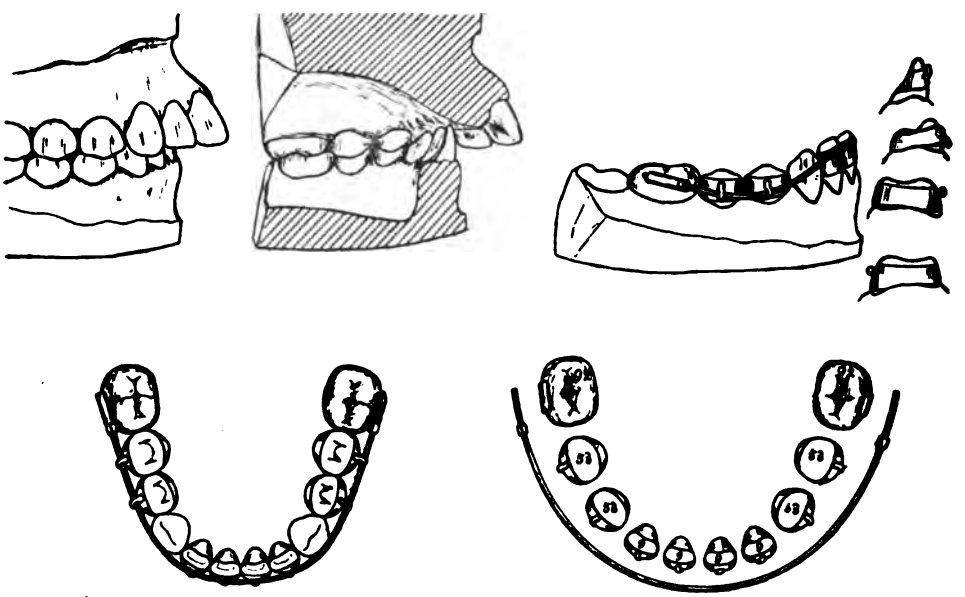
Fig. 7 arch bows with ends resting in molar tubes are attached to the malposed teeth with hooks or open-tube attachments. To the lower bow, spur tubes are attached with soft solder at the desired places, or spurs may be attached in like manner to both bows. From these, elastic rubber "election rings" are passed over the upper bow and back to the spurs, or the small elastic rings manufactured by Ash & Sons may be passed from the upper to the lower spurs. These are

If the bicuspids are not involved, a No. 19 or 20 resilient arch bow, with its ends resting in long tubes attached to the buccal teeth and passing over hooks on the labial teeth, will usually accomplish the objects both of extrusion and retrusion—the bow being sprung according to the demands. If nuts are not needed on the bow for extruding and retruding purposes, it may be slightly flattened its entire length by passing it through the rollers; then by resting the ends in flat-

tened buccal tubes it will give a greater resilience to the bow and less irritation to the lips. When the upper and lower teeth are in normal alignment and antero-posterior relations the retaining appliance very imperfectly shown in Fig. 8 may be attached.

Fig. 11.

Fig. 12.



The principal technic construction of this appliance is described in the June *Cosmos.** (See Fig. 9.) The variation from the regular retaining appliance that is here shown is the spurs which are attached to the interproximal extensions, for the attachment of elastic rings, the employment of which should be continued by the patient as long as there exists any tendency toward an opening of the bite.

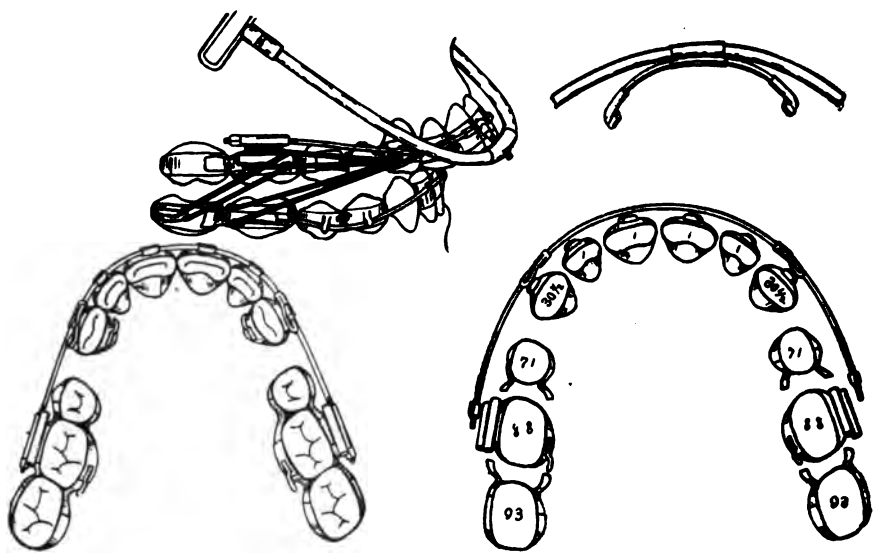
In extensive open-bite cases all of the teeth except the molars may be involved, and occasionally only the first or second molars occlude, as shown in Fig. 6. If the patient is very young and the mandible is protruding—as frequently obtains

*Calvin S. Case, "Principles and Technic of Retention in Orthodontia," *Dental Cosmos*, vol. xlvii, p. 649.

in these cases—the occipital apparatus with chin-piece, if worn persistently, may accomplish much good. If, however, the lower jaw be not protruding, the direction of the occipital force will tend to retrude it and therefore it should not be used on an undeveloped lower jaw.

When the lower teeth are protruding in relation to the protruded lower jaw, as

FIG. 13.



was shown in Figs. 4 and 5, the occipital apparatus with a bow similar to that shown in Fig. 10 is one of the most effective methods of retruding the lower teeth and at the same time extruding the labial teeth, to aid in closing the bite. During the hours that the occipital force is applied, which will tend to keep the jaws closed, the disto-mesial intermaxillary elastics may also be employed as an auxiliary. At other times, when the mouth is open, the intermaxillary force attached to the upper molar teeth will tend to extrude them, and increase the extent of the open-bite occlusion. The direct intermaxillary force, however, may be applied in these cases and worn at all hours.

It is to be understood, also, that whatever the irregularity besides the open-bite occlusion, the apparatus is to be so constructed and the proper forces applied that a concomitant correction may result.

Everyone who contemplates the correction of open-bite irregularities should fully understand that the difficulties and dissatisfaction that arise in the final retention of the corrected teeth are quite in proportion to the extent of the extruding movement and the number of teeth involved. In extensive cases, therefore, much may be gained by freely grinding the occluding surfaces of the antagonizing teeth. If it were for no other reason than the improvement in masticating possibilities, no one should hesitate to devitalize the upper molars if necessary

for this purpose, to aid in closing the bite and in the greater possibility of permanence of retention.

CLOSE-BITE MALOCCLUSION.

In typical close-bite malocclusion, when the jaws are in masticating closure, the lower incisors usually strike the gum back of the upper incisors, and at times well back upon the lingual aspect of the alveolar ridge.

sion obtained, similar to that shown in Fig. 12. With the lower labial teeth in this position it can at once be seen that any attempt to retrude the upper labial teeth would drive the lower incisors farther into the gum, therefore the first demand is to open the bite by extruding the buccal teeth and intruding the incisors.

At the meeting of the Illinois State Dental Society in 1892, the writer pre-

FIG. 14.

This character of malocclusion may occur in any irregularity in which the upper teeth in relation to the lower are quite decidedly protruded—the dento-facial extremes of which are protruded uppers with lower normal, and retruded lowers with upper normal. In the writer's experience it has occurred most frequently in retrusions of the lower accompanied with slight protrusions of the upper. In four of the five cases selected at random from many of this class, shown in Fig. 11, a close-bite malocclu-

sented the history of a case in which a close bite of the above character was corrected by a rubber plate which prevented the buccal teeth from striking until they grew to the proper occlusal plane. This was published in the *Dental Review* of July 1892.

While the method has doubtless proved successful in other hands, it was discarded by the writer long ago with other forms of regulating plates and upon the establishment of the system of attaching force appliances to dental

bands. It is therefore painful to see in some of the recently published text-books my original illustration, together with a description of this obsolete method, presented as a thing of present value, when it should have been relegated to the past years ago.

In 1896 the writer produced another method of correcting close-bite malocclusion which he is pleased to see has become one of the practically efficient methods of orthodontia. By its application the difficulties of correcting this most annoying malocclusion of the teeth are removed.

As shown in Fig. 12, hollow crowns are fitted over the lower first molars, which at once opens the bite and forces the patient to eat for the time being upon the oldest and most firmly established teeth in the mouth. To the crowns are soldered buccal tubes, one of which is open, and to the bicuspids and incisors are attached bands which carry hooks placed in such a position that a resilient German silver bow No. 22 placed as shown will tend to extrude the bicuspids to the new plane of occlusion, and intrude the incisors.

The first molars are well calculated to withstand the strain of mastication until the bicuspids are lifted and the second molars grow to an occlusion of sufficient stability to take their share of the work. When the sockets of these teeth have become solidified the crowns and lower apparatus can be removed, whereupon the first molars will then grow to their proper occlusion.

The apparatus for retruding the upper labial teeth and correcting the disto-mesial malocclusion of the buccal teeth with the intermaxillary force may be placed when the lower apparatus is attached. In nearly all of these cases the writer utilizes the intruding and retruding tendency of the occipital force upon the upper labial teeth, and the extruding tendency of the intermaxillary force upon the lower buccal teeth. (See Fig. 13.)

In many instances, as shown in Fig. 13, the extruding force of the intermaxillary elastics upon the buccal teeth will be sufficient in themselves to open the close bite without the placing of crowns.

FULL CLOSE-BITE MALOCCLUSION.

A very rare case of close-bite malocclusion, differing decidedly from the above, occurred in a miss of fourteen and has recently fallen under the writer's observation for treatment. It consists in all of the teeth, both front and back, being quite decidedly too short in relation to the occlusal plane of perfect dento-facial harmony. In other particulars the teeth are in fair alignment, antero-posterior relations, and occlusion, and when the jaws are held apart, with the lips in esthetic pose, or while talking or laughing, one would hardly imagine the existing state of malposition. But when the jaws are closed, with the buccal teeth in occlusion, the physiognomy is at once disfigured by an expression of maturity as in an edentulous patient, which is due to the unesthetic shortness of the distance from nose to chin and the abundance of labial and buccal tissues. (See Fig. 14.) Moreover, the difficulty of occluding the teeth, with a slight disturbance of the temporo-maxillary articulation, has led her to the use of the incisor teeth to a more or less extent for masticating purposes. On the left of the figure is shown the profile model and teeth while in masticating occlusion. I

regret that it does not fully express the facial disfigurement, which is far more pronounced from the photograph of a plaster model. On the right the jaws were opened as shown, by placing between the teeth a piece of modeling composition, and while in that position the facial impression was taken from which the model and illustration were made. The proportionate excess of the lip tissue would have permitted the jaws to have been opened twice as far apart without disturbing the ease of a perfect closure of the lips. The model was made to show the dento-facial position and the outlines which I hope to attain by extruding all the teeth.

The apparatus which is now attached consists of four crowns placed upon the first molars, which opens the jaws to about one-half the desired extent, to start with. The bicuspids and labial teeth are all banded with attachments to support alignment arch bows with spurs for the attachment of the direct intermaxillary elastics, so as to extrude all of these teeth with a uniform movement, treating the case in this particular as though it were an open-bite malocclusion. Provision is also made for the attachment of the disto-mesial intermaxillary elastics for the purpose of closing the interproximal spaces and correcting the occlusion by a retruding movement of the upper labial teeth and a mesial movement of the lower buccal teeth.

Discussion.

Dr. S. H. Guilford, Philadelphia, Pa. I think we have all been entertained and instructed by Dr. Case's paper, which has been made more intelligible by the illustrations thrown upon the screen. I agree with very much of what he has said, yet on some points I disagree with him.

In the first place I object to some of his terminology. At times he spoke about open-bite occlusion, and at other times of open-bite malocclusion. It seems to me that this is incorrect, because while the word occlusion is an excellent word, it means a coming together. Teeth are only in occlusion when they do come together. If they come together improperly and irregularly we have malocclusion, but when they do not come together we have "non-occlusion." Therefore when we find non-occlusion in the anterior part of the mouth, it should be called anterior non-occlusion. We cannot have a bite in the proper sense without contact, and we cannot have occlusion without contact. His terms remind me of an individual who was asked to define Christian science, and he answered that in the first place it was not Christian, and in the second place it was not science. And so when we use words to express certain conditions we should have them as nearly right as possible.

In regard to the cases of anterior non-occlusion, Dr. Case describes the influences that bring about these conditions, and his explanation to a certain extent seems plausible. He tells us first of all that it is largely due to mouth-breathing, because in mouth-breathing we have a contraction of the muscles. On the one hand, he said, we had a fulcrum at the temporo-maxillary joint, and then we have the action of the masseter muscle drawing upward and the action of the hyoid muscle drawing downward. That would seem to be a good mechanical explanation, because when we have a point of this kind [illustrating a lever of the third class] and exert the pressure in the middle, we might have the condition he

spoke of—the bending of the bone. But the question arises, Does that take place? Probably we are all familiar with the story told us in childhood about a king who called into his presence a number of scientists and asked them to explain why it was that when a glass was entirely filled with water so that another drop would cause it to overflow, if one dropped a gold sovereign into the glass it would not overflow. One of the scientists tried to explain why it would not overflow; and then another took it up and tried to explain it in his way. While this was going on one of the scientists slipped into an adjoining room, tried the experiment and found that it did overflow. When he was asked why it would not overflow he said that it would, because he had tried it. The king commended that man; he did not want them simply to accept anything that he or anyone else said; they should not attempt to explain anything unless they knew that it did occur. Now, the question is, Does this condition occur in the case of the jaw as Dr. Case has explained? It would seem so at first sight, but what takes place when a person is asleep? Why do the eyelids close? Is it due to muscular contraction or to the relaxation of the muscles which in conjunction with the attraction of gravitation causes the eyelids to fall? Also, why is it that when an individual falls asleep the mouth will gently open? Is that due to the action of the hyoid muscle drawing the jaw down or to the relaxation of the masseter muscle? Is it not due to the fact that all of the muscles are relaxed for the time being? If the masseter muscle is acting with the mouth open, does the hyoid muscle counteract that? No, because both of these muscles are in a state of rest. What probably is the cause of this anterior non-occlusion, or to what is it most likely due? I believe it is due to lack of development in the anterior part of the jaws We know that the alveolar process forms around the roots of growing teeth, and that as the roots develop the process increases in height. If there be an arrest of development, and the teeth do not become fully extruded, there is no necessity for the alveolar process to continue its development and it does not do so.

Now as to the treatment. If the lack of occlusion in front be not very great, and if the features have not been affected unfavorably by the condition, the best thing I know of is to extrude the upper and lower teeth. This can be done without much difficulty; but while it is not difficult to force the teeth out of their sockets it is very difficult to hold them there until new material is formed around them sufficiently to resist the strain of mastication, and that is where the trouble lies. But suppose there is a great lack of occlusion. While a child is young you can exert pressure on the chin and gradually force it up until the anterior teeth come into occlusion. In doing so you will have tilted the condyle somewhat out of the glenoid fossa, but that will adjust itself in time. If cases be taken early enough there is no reason why great improvement should not be made. If, however, the case comes to us later in life, when we cannot hope to make any anatomical changes, and if the lack of anterior occlusion is considerable, what are we to do? Under these circumstances there is but one thing that we can do; namely, grind off some of the molar teeth, preferably the upper ones. The operation may be somewhat painful, but the pain can be lessened by an obtundent. If you have to grind much it may be necessary to devitalize one or more of the

teeth, after which one can continue grinding until a considerable improvement results. You may not get all the improvement you want, but you can get a great deal. I do not think anyone who practices orthodontia would tell a patient that he could bring about a perfect occlusion in the anterior part of the mouth in these cases; all we can do is to improve the condition. Some practitioners are opposed to grinding the teeth and devitalizing them, while others go even farther. Dr. Jackson suggests extraction in certain cases, and in extreme cases resecting some of the alveolar process, afterward putting in a plate for the lower teeth to bite upon. That seems like extreme practice, and yet sometimes we have to resort to radical methods, just as a surgeon does. The main thing to do is to use our judgment in bringing about the best results.

In the other condition which Dr. Case speaks of, and which I would describe as extreme overbite, we have an excessive overlapping of the upper anterior teeth. What is the cause of it? I think it is due to one of two causes. Either, for some reason or other, the posterior teeth in the course of their eruption may have failed to come down to their proper length so as to establish contact between the upper and lower ones, or there may have been an excessive development of alveolar tissue in the upper anterior region. I believe the condition is most frequently due to the lack of full eruption on the part of the molar teeth. Where there is not this shortening of the molars, and sometimes where there is, we find the lower incisors considerably extruded above the normal occlusion plane. In connection with this we not only have the excessive overbite of the upper incisors, but also their protrusion. In cases of this kind two things are necessary. First, we must get rid of the interference which exists in the lower incisors; they must be pressed down in the alveolus farther than they are. If this be not done it would be impossible to move the upper incisors back. Next, the posterior teeth must be extruded. Dr. Case does that very nicely by means of a well-known appliance of his. I am sorry that he took such extreme ground in regard to certain appliances that have been in use for many years and have served their purpose well. The plate that he speaks of is nothing more than a vulcanite plate with which the lower incisors come in contact. When in place only the lower incisors bite upon it, and that causes the teeth to become gradually intruded, or made shorter; this once accomplished, opportunity is afforded for drawing the upper incisor teeth backward. The main thing is to get the posterior teeth extruded and the lower incisors intruded. For years I have used the vulcanite bite-plate almost exclusively in cases of this character. I insert it and let the patient wear it for from six months to a year. When the child comes back at the end of that time we find the lower incisors considerably intruded and the posterior teeth extruded. This plate has worked satisfactorily and has never failed me in a single case. This condition of excessive overbite is very much more easily corrected than the other condition spoken of.

Dr. V. E. Barnes, Cleveland, Ohio. Some of the results shown are excellent, and are ideal for the conditions. The best we can do in many of these cases is all that can be expected. Such conditions and deformities are among the very worst the orthodontist is called upon to treat, and too much credit cannot be bestowed for any close approximation to

the normal bite. As to the cause of open bite I am not fully agreed with the writer, for the evidence to date points to adenoid conditions as the cause of mouth-breathing. Nose and throat specialists tell us they find adenoids and enlarged tonsils in mere infants of a few weeks. This would mean mouth-breathing long before the habit could have been formed. Another thing that I cannot believe is as to the extent of the seeming bend in the mandible. It seems bent somewhat, but probably not as much as is here given credit for; rather, I take it, the upper molars have shifted downward and inward, and the lower molars upward and inward, which shifting would surely cause an open-bite case.

Many open- and close-bite cases are not at first evident, but reveal themselves to the experienced operator in many protrusion or retrusion cases. I believe that many of the failures in orthodontia are due to not considering these bite conditions, which are as much an irregularity as the mesial or distal, or lingual or buccal, or labial malpositions.

Dr. I. J. Wetherbee, Boston, Mass. I disagree with Dr. Case about using a plate for the correction of the condition where protruding lower incisors are found associated with close-bite distal occlusion. The inclined plane firmly attached on an appliance which is anchored to the first bicuspids, the central incisors and other anterior teeth if necessary, seems to me to be indicated in the treatment of this class of cases. It not only retrudes the lower incisors, but it opens the bite as well, allowing the bicuspids and molars to elongate. It also tends to secure normal occlusion by the so-called jumping of the bite. The bands are connected by a heavy wire, and those on the anterior teeth being soldered together and to the wire and inclined plane make a strong and firm appliance.

Dr. Harry E. Kelsey, Baltimore, Md. I have enjoyed very much the presentation of Dr. Case's paper and the results shown on the screen. In the last year I have had a number of cases which bear on this line of work, and the results obtained seem to me to bear out Dr. Case's ideas. The appliances which I employ are constructed upon the same principle as his—many of my ideas, indeed, having been gathered from his valuable writings. I differ from him, however, in having fewer bands upon the teeth, ligatures of silk, sea-grass line, or wire being substituted where possible, because they do not leave the teeth separated when removed.

Cases of great protrusion of the maxilla with accompanying retrusion of the mandible have not, in my opinion, been successfully dealt with by the use of plates, or of crowns on the molars. By the use of intermaxillary elastics in conjunction with such appliances as Dr. Case has described, a reciprocal movement of the jaws is brought about, the lower jaw being drawn forward, and the upper teeth, together with the process around them, being drawn back, thus bringing the jaws and their teeth into normal relation with each other and with the rest of the face. Where these cases are further complicated by a very close bite, as has been shown to be frequently the case, all of the teeth posterior to the incisors and canines may require lengthening or elevating in their sockets. This will be accomplished in the molar anchorages by the action of the elastics, if they are properly adjusted, and the bicuspids will rise or elongate naturally to meet the new conditions. In all these

cases I believe the teeth will adjust themselves wonderfully if the jaws be held in correct relation to each other.

I think the methods and appliances which Dr. Case has presented cover every contingency which may arise in the correction of these cases.

Dr. CASE (closing the discussion). I realize the importance of a perfect nomenclature in orthodontia, especially in the naming of conditions which are not fully recognized among recurring characters. Dr. Guilford and I fight along these lines quite often, but usually get close together before we quit. He does not like my term "open-bite malocclusion," and I certainly do not like his term "anterior non-occlusion." My reasons are: When the jaws and teeth are in the position of occlusion, the front teeth in a *normal* state are usually in non-occlusion. Again, when the front teeth are in incisal antagonism they are usually in contact only at one or two points. So, even then, the bite of many of them is open. In other words, why name as a distinct abnormal character that which exactly defines a condition that nearly always exists normally? Moreover, the term does not fully express the condition, for the reason that it is not wholly the "anterior" teeth that are in non-occlusion, but often it is the bicuspids, and occasionally the first molars—only one molar on each side antagonizing when the jaws are brought together. In choosing a term for this condition "open-bite malocclusion" is particularly applicable, because the biting teeth are always open as one of the definite characters of the malocclusion. And for the same reason "close-bite malocclusion" is applicable for the opposite condition.

In regard to the causes of this condition, I would like to have Dr. Guilford step up here in the light and show the well-defined action of the os-hyoides muscles pulling down the chin, inactively opposed to the masseter and internal pterygoid muscles. It is not wholly an involuntary action as has been stated, because the mandible assumes its natural position when the mouth is closed. The mouth is therefore absolutely forced open and held by the os-hyoides muscles when there is any obstruction to normal breathing, and being opposed by the masseter and the tissues along the middle of the jaw, rests at the condyles as fulcra, the continued action of these forces causing the jaw to retain more or less of the childhood obtuseness at the angles of the rami and body. If the jaw were bent more at this point [indicating] the front teeth would close.

Dr. Barnes seemed to think that I did not recognize the fact that mouth-breathing was caused by some obstruction of the nasal tract. I think I stated that very plainly in my paper.

Dr. Case's paper was passed, and the chairman announced as the next order of business the reading of a paper by Dr. FREDERIC FREEMAN, Boston, Mass., on "Restoration of the Functions of Mastication Subsequent to Removal of Portions of the Mandible, Including the Temporo-Maxillary Articulation," as follows:

The Restoration of the Functions of Mastication Subsequent to the Removal of Portions of the Mandible, Including the Temporo-Maxillary Articulation.

By FREDERIC FREEMAN.

THE device which I am about to describe applies to cases in which portions of the mandible have been removed, including the temporo-maxillary articulation. The object of the appliance is to restore the function of mastication and the articulation, and also to fulfill cosmetic indications.

In order to accomplish these objects, it is necessary to construct an appliance that shall fill the space produced by the removal of the teeth and bone, holding the remaining portion in place, and allowing nearly the normal motion of the parts.

In presenting this subject to you, I wish to state that in the construction of these appliances I have simply applied established ideas and principles to a new use, thus demonstrating the possibilities of facial prosthesis.

It will be both interesting and necessary, in a retrospective way, to briefly outline what had been accomplished up to the time of my previous introduction of this subject in 1900.

In the *Dental News Letter* of April 1857, page 227, an apparatus to remedy the entire loss of the mandible and teeth is described by C. A. DuBouchet, M.D., D.D.S., invented and constructed by MM. Fowler and Preterre of Paris.

In the *Dental Cosmos,* vol. xxxv, page 973, we find that Dr. Claude Martin of Lyons, France, exhibited at the World's Columbian Dental Congress, at Chicago, in August 1893, a collection of appliances. After being worn a few months, the object having been accomplished, they are removed and replaced by a hard-rubber plate and teeth of similar form.

In the *Dental Cosmos,* vol. xxxiii, page 730, Albert Westlake, D.D.S., Elizabeth, N. J., reports on a case of facial restoration. I will quote from his paper: "The final plan was to make for the upper left molars two gold crowns, which were soldered together, and at their bucal junction there was soldered a stiff knobbed wire, projecting downward at an angle of about forty-five degrees. A gold cap-crown was also made for the lower left canine, and to the labial surface of the crown was soldered another short knobbed gold wire, extending in the direction of normal occlusion. A steel spring, similar to that used in the flexible connection of the dental engine with the handpiece, was repeatedly cut off and tested until the required resilient power was found in a length of thirty-two coils. This spring was electro-plated, and the looped ends slipped over the knobs on the crowns, which had been previously cemented on the molars and canine respectively. The action of the device was very gratifying, for when the patient closed her mouth the remaining teeth were brought into normal apposition."

In the *Dental Cosmos* for June 1899, page 517, Dr. Naaman H. Keyser of Ger-

mantown, Pa., reports on a case of restoration of the mandible.

I wish to call your attention particularly to a fact which has undoubtedly suggested itself to your mind, that while these appliances were, in a way, probably quite satisfactory and ingenious, they had practically but cosmetic objects in view, and did not restore the function of mastication.

Many of you undoubtedly recall the case I above referred to, namely the one presented in 1900. The right half of the mandible having been removed, as far as the symphysis, and the wound having entirely healed, the case presented itself to me one month after the operation.

History of the first case. A man, age forty-five, passive temperament, reconstructive qualities good, endowed with an extreme amount of endurance.

After making a somewhat exhaustive search through the literature of dentistry in the hope of finding some suggestion which might enable me to devise an appliance, I found nothing on the subject, and speaking to a number of dentists relative to the subject I received from them no encouragement whatever.

The teeth in this case were almost perfect, sound, strong, and healthy. There were fourteen teeth in the maxilla, the third molar having been extracted. On the remaining left half of the mandible were two incisors, canine, two bicuspids, and the first and second molars.

In constructing this appliance the upper right canine, the two bicuspids, and two molars were crowned and soldered together at the coronal surfaces. To the upper second molar was attached a ball-and-socket joint. All the remaining teeth on the lower left half were crowned, with the exception of the incisors. On the lingual side of these teeth runs a bar extending from the last molar crown on the left and soldered to all the crowns. This bar, which extends to conform to the contour of the entire lower arch and is made of iridio-platinum, is elliptical in shape posterior to the canines and incisors (the ellipse being horizontal), and squared as it runs backward. The bar is meant to be worn permanently. On the distal end of the buccal side of this bar is a heavy platinized gold tube or sleeve, into which the rod from the ball slides, thus allowing the jaw to protrude that the incisors may come together.

A lug is soldered on top of the distal end of the bar, to hold one end of a plate fitted to the bar in place. The other end is held by a pin passing through the front side and under the bar. To this plate are attached artificial teeth, and it can be removed by the patient at will. After completing this appliance, and having placed it in the patient's mouth, he was able to articulate intelligibly, the facial deformity was almost entirely obliterated, and the function of mastication was restored to a very satisfactory degree.

In October 1904 it was my pleasure to have a conversation with our esteemed member, Dr. Stanley of New Bedford, Mass., who related to me some facts concerning the case which I am about to describe. Before entering into a description however, I wish to extend my thanks to Dr. Stanley for his interest in the case to which I now wish to call your attention. It is one of extreme interest to us as dentists, and likewise to the general surgeon, as it may be the source of relief to patients afflicted with this distressing deformity.

History of the second case. Mr. B., age thirty, of good physique, presented

himself to me in November 1904, in the following condition: The right side of the mandible having been removed as far as the left first bicuspid, and the wound having healed nicely, the mouth presented the following peculiarities:

The cicatricial tissue formed by the new attachments of the muscles of mastication on that side had a tendency to shorten considerably these muscles, and a general contraction of the neighboring soft tissue had supervened. This consequently was a great factor in the deformity that existed on that side. The portion of jaw remaining, having no opposition, was drawn toward the opposite side.

In these cases, after operation is performed and the wound has healed, the remaining half of the jaw being drawn out of its habitual position by the contraction of the muscles and wound tissue, the occlusion is imperfect, and the jaw rotates inward on an axis which passes horizontally from before backward through the temporo-maxillary articulation, in such a manner that the occluding surfaces of the teeth incline inwardly, and the outer or buccal surface of the jaw upwardly. When the patient brings the teeth together the buccal surfaces of the lower strike the lingual surfaces of the upper. If the coronal surfaces are brought together by force, the jaw will immediately rotate on its own axis. During muscular relaxation the jaw is drawn toward the median line by the contraction of the muscles and cicatricial tissue, and to such an extent that it is impossible for the patient to articulate properly and the function of mastication is completely lost. A description of the teeth remaining intact is necessary to a clear conception of the case, and also because it bears on the construction of the appliance.

In the maxilla the following teeth were present, apart from the six anterior teeth, of which the left central was supplied with a porcelain crown. On the left side, the first bicuspid, the second and third molar; on the right side, the second and third molars, the missing teeth having been extracted some years previous.

Construction of the apparatus. These six anterior teeth were bridged to the two right molars to form the base of the anchorage to which the socket is attached. These teeth were crowned with 20-karat gold, No. 26 gage, and soldered together, making one continuous piece from the left canine to the right third molar. The socket was soldered to the coronal surface of the right third molar crown at almost right angles, allowing it to drop as far as possible. This socket is about $\frac{5}{8}$ inch long, $\frac{5}{16}$ inch wide, and $\frac{1}{4}$ inch thick, has a face, which is bolted to the anterior surface, and is provided with an elliptical opening (the long diameter of the ellipse being vertical) for the passage of an iridio-platinum rod, which is attached to a ball of gold, within the cavity made by the socket and face. This rod extends forward about $\frac{1}{2}$ inch from the face of the socket. The construction of this ball-and-socket is practically the same as the one used in the previous case.

The two bicuspids and the three molars on the remaining portion of the mandible were fitted with telescope crowns, the inner crowns of 22-karat gold, the telescope crowns of 20-karat No. 26 gage. To these five telescope crowns is soldered the heavy gold bar which takes the place of the extirpated portion of the jaw, bent to the form of the arch, and over the outside of this bar is soldered a piece of gold so constructed as to simulate the missing teeth. On the distal end of this gold bar is attached a

sleeve, into which the rod from the ball-and-socket joint slides, and which increases to a very great degree the amount of motion allowed.

By the peculiar arrangement of the telescoping crowns this artificial piece can be easily removed by the patient.

In making the bar to which the telescope crowns are attached, great care has to be taken to have the bar of the exact length and curved to conform to the probable outline of the natural mandible. On the length of this bar depends the whole secret of successfully restoring the remaining portion to its normal position.

To the under side of the bar is attached a section of vulcanite rubber of sufficient size and shape requisite to supply the deficiency of contour, and also to furnish a larger area of contact for the cicatricial tissue to operate on while the movements necessary to mastication are being carried out.

In these cases, with the appliance adjusted, the opening of the mouth is not equal bilaterally. This irregularity is due to the position of the ball-and-socket joint, it being placed anteriorly to the temporo-maxillary articulation on the opposite side. However, this is scarcely noticeable, and in no way interferes with the natural functions of the jaw.

Additional literature on the subject can be found in the following publications:

Dental Cosmos, vol. xxxiii, page 822.
London Review, vol. v, page 279.
Dental Record, vol. x, page 198.
American Journal of Dental Science, 3d series, April 1889, vol. xxii, page 558.

Discussion.

Dr. M. H. Cryer, Philadelphia, Pa. I do not wish to take Dr. Freeman to task for criticizing the medical fraternity, as I happen to be both a medical and dental man, but one reason why medical men do not consult dentists in such cases is this: We have not in Buffalo, Philadelphia, Chicago, or even in New York, artists in the line of work he has shown us. When we have such men of ability in every city, then the physician will consult them. It has been my sad experience in Philadelphia to see cases in which some eminent surgeons have resected one-half, or the anterior portion, of the mandible without consulting a dentist. At the present time, however, through the work of the pioneer of oral surgery, Garretson, and some of those who are endeavoring to follow him, the better surgeons today in Philadelphia will not undertake any operation in this line until a dentist is consulted. For instance, there was a case not long ago of a man who had a sarcomatous growth on the anterior portion of the mandible, and it was decided by Dr. J. William White that the anterior portion of the mandible, as far as the molar teeth, would have to be resected, but he consulted a dentist connected with the University of Pennsylvania before performing the required operation. After consultation it was decided to make an appliance that would hold the remaining portions of the bone in position. The operation was performed and the appliance inserted before the incisions were closed. In three or four weeks the man went away from the hospital with a substitute for the bone and teeth that had been removed, and made a very presentable appearance. (For full report of this case see *University Medical Bulletin*, for June 1900.)

With regard to the case of the clergyman whom Dr. Freeman spoke of, I have

had the great pleasure of seeing him in my office and at the clinic at the University of Pennsylvania, and I must say that I have never seen a more ingenious appliance placed in the mouth by any oral surgeon either in France, Spain, or America, and I congratulate Dr. Freeman on his work and its good results.

Dr. FREEMAN (closing the discussion). In the case referred to by Dr. Cryer which he said I treated so well, I consider it a failure in the sense that I now know that the teeth under the crowns that were made to be worn permanently cannot last as long as the teeth in this case will. Those teeth should have been crowned and telescoped, so that the appliance could be taken out and cleaned. There is salivary hypersecretion in these cases which differs from the saliva in normal mouths, where the large flow is of alkaline reaction. In these mouths it is acid. The flow is so great that one is greatly bothered by the secretion in the mouth while working. In the case of the clergyman, if I could only get him back to Boston, I would remove the appliance he is now wearing and substitute it by one absolutely permanent.

Dr. HINMAN. I want to thank Dr. Freeman especially, as chairman of this section, for this most beautiful piece of work. I have a case in my practice that is nearly a duplicate of the one he has shown here, and I am going to try such an appliance for it.

Motion was then made and carried to adjourn until Wednesday afternoon.

SECTION I—Continued.

SECOND DAY—Wednesday, July 26th.

THE meeting of Section I was called to order at 2.30 o'clock on Wednesday afternoon, July 26th, by the chairman, Dr. T. P. Hinman.

The first order of business was the reading of a paper by Dr. V. H. JACKSON, New York, N. Y., on "Orthodontia," as follows:

Orthodontia.

By V. H. JACKSON.

IN the study and practice of orthodontia and orthopedia of the face we are seeking the most practical methods of correcting malocclusion of the teeth and improving the outline of the features. For many years it has been the aim of the writer to develop a system that would meet all requirements and cause the least discomfort to the patient during the use and manipulation of the appliances. After carefully considering the different means of causing force for regulating I adopted the metal spring, as by its use force is applied for a longer duration without interference or change of form than by methods generally employed, patients usually being seen but once a week. The degree of force to be exerted is governed by the size of the spring employed.

The anchorage of the appliances to the teeth is gained by means of partial clasps and spring-clasp attachments over one or more molars or bicuspids on each side of the arch. The effect of the spring-clasp attachments in grasping the teeth is similar to the action of the rubber-dam clamp. To the spring-clasp attachments and partial clasps is soldered a large wire of suitable shape to form the foundation of the regulating appliance. It is termed the base wire or body of the appliance. From this body, springs or arms of wire are extended on the principle of human arms or fingers, which are shaped in the required form for moving the teeth by pushing or pulling them in the desired direction. In making the springs the shape is best determined by imitating the curve that one's finger would take in moving a similar body. This kept in mind assists one in designing the apparatus on a plaster model.

It is my purpose to speak briefly of

the adaptability and some of the other advantages of the Jackson system for regulating teeth. It is applicable to all forms of irregularity and at any age; it is readily removed by the patient for cleansing. It does away with the objectionable features of other methods, such as the use of collars as a general means of anchorage, which require the wedging of the teeth for their application, and then the cementing of the collars to the teeth; the fitting of collars to the teeth with screw and nut; the time required for the adjustment of screws, tubes, nuts, and ligatures for utilizing force; the use of ligatures about the teeth, which are liable to slip and injure the gum, and which need frequent replacement; their uncleanliness, etc.—methods generally demanding that the patient be seen every one, two, or three days. As the force of a spring of suitable size is continuous for a week or more without change, requiring that the patient be seen only once in that period, it has an advantage, as on an average, at least six times as many patients can be seen as when an appliance with either ligatures or screws is used. There should be no discomfort to the patient when force is applied gradually by a spring appliance that has been properly made and fitted on an accurate model.

Generally an appliance with springs of this character can be made by the experienced in about an hour. It has been charged that the making of the appliances is difficult to learn. This is a mistake, as the principle of the construction of the appliances for the different movements of the teeth can generally be acquired in a few hours. In this connection, it will be remembered that but a few years ago it was claimed that crown and bridge work would remain in the hands of specialists. Now nearly all practitioners do more or less of crown and bridge work. There is no reason why general practitioners of dentistry with ordinary mechanical skill, if they have the time and desire, should not take care of a large percentage of the cases of irregularities of their patients, by setting aside one hour of the day when patients can call to have additional force applied by bending the springs, which usually takes but a few moments. This plan is carried out by some practitioners for treating teeth and making examinations. Attention will be called to a few important appliances that are not generally understood.

When the teeth are irregular they are usually crowded, requiring that the arch be expanded for their correction. When expansion is necessary, it should usually be done when the irregularity first becomes apparent or soon after, while the jaw is in the developmental stage, thus encouraging a normal growth. The expansion of the dental arch early in life sometimes proves more effective than its expansion later. The expansion of an arch of deciduous teeth by my system is usually not more difficult than expansion of the arch after the permanent teeth are in position.

Generally the distal part of the arch is broad enough. In such a case, when other portions of an upper arch need expansion laterally, an apparatus is constructed as seen in Fig. 1. A palatal base wire, about No. 13 gage, is arranged to follow the palatal curve, crossing the distal part of the arch where it is sufficiently broad. The ends of the base wire are bent forward and inclosed in the anchorage. Force is developed by bending outwardly the anchorage portions, or the arms, causing the lateral expan-

sion of the anterior part of the arch. When the distal part of the upper arch is not broad enough, and its expansion is desired, the palatal base wire is located far back, with the arms extending forward to enter the center of the anchorage portions, and properly soldered. (Fig. 2.) With the appliance made in this manner, the distal or anterior portion of the arch can be broadened at will, or the whole arch be broadened by shaping the arms of the base wire as required.

In expanding the lower arch, an appliance of the same general principle is employed, using a lingual base wire with arms extending backward to enter the anchorage portions as seen in Fig. 3. A similar appliance was used in the case of a boy of seven years, of nervous temperament, in which the disparity in the size of the arches was so great that the teeth of the lower arch closed entirely inside the circle of the upper arch, none of the teeth occluding. The lower arch was expanded laterally, by bending outward slightly at intervals of one to two weeks the lateral arms of the base wire. The incisors were forced outward by finger

Fig. 1.

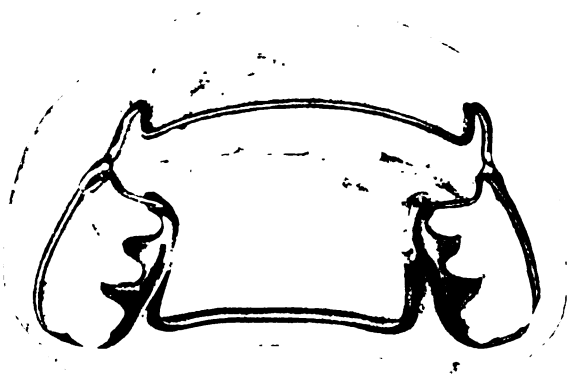
Fig. 2.

springs extending forward from the anchorage portions, one on each side of the arch. The jaws were harmonized as illustrated in the casts I here present. The same appliance was used for retaining. I would like to ask what other method could have been employed to accomplish this result—expanding the lower arch so extremely, with the deciduous teeth present, without discomfort or the patient shedding a tear?

Not infrequently *contraction* of the dental arch is required. The contraction of the upper arch is accomplished by an apparatus made with either lingual, palatal, or labio-buccal base wire, according to the movement desired. The palatal base wire with arms projecting forward is used for contracting the arch laterally by being arranged to cross the distal part of the arch, the arms extending forward to enter the center of the anchorage portions, as shown in Fig. 4. In place of ordinary spring clasps for anchorage, continuous spring clasps are employed. Force is developed by bending inward the arms of the base wire. When contraction of only the distal part of the

FIG. 3.

FIG. 4.



arch is required, a labio-buccal or lingual base wire can be used. Fig. 5 illustrates an appliance for this purpose, with a lingual base wire anchored by partial clasps and continuous spring clasps. Force is exerted by bending inward the sides of the base wire. When at the same time the anterior part of the arch needs contraction, a semicircular spring with U-shaped loops is formed to cross the labial side of the incisors. The loops are arranged to project up under the lip, one opposite each canine, and the ends of the spring are soldered to the continuous spring clasps. Force for moving the incisors inward is secured by closing the U-shaped loops. A semicircular spring with U-shaped loops for contracting the anterior part of the arch is also used in connection with a palatal base wire.

Fig. 5.

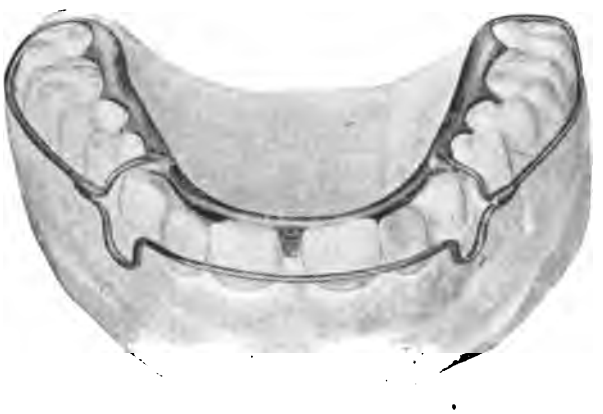
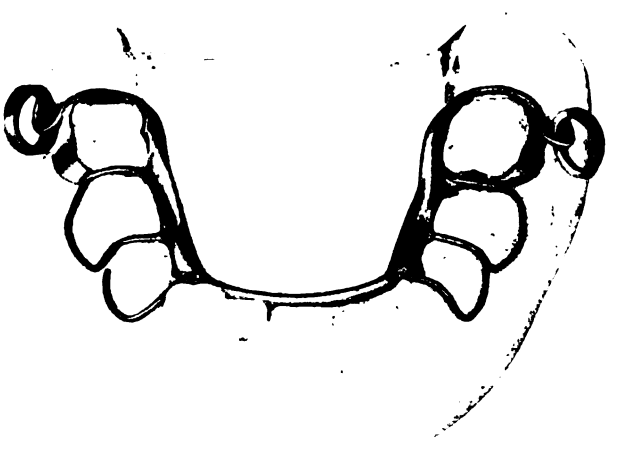


Fig. 6.



I am often asked how I equalize the jaws. Of course the method employed is governed by the requirements. In case of extreme upper protrusion with receding lower jaw, elastic ligatures are sometimes employed. An appliance is an-

chored to the teeth of the lower arch by partial clasps and spring-clasp attachments (Fig. 6), and a hook attached to the apparatus in the distal part for a rubber equalizing band that extends to a similar hook on the anterior part of an apparatus in the upper arch. Sometimes, in place of a spring clasp attachment passing over the last molar, especially when it is not well erupted, the anchorage is improved by soldering a wire to the anchorage portion of the appliance opposite the linguo-distal surface of the molar. The wire is shaped to pass back of the molar and curve forward to rest on the buccal surface, forming a wire clasp. one on each side of the arch. The end of the wire is bent backward on itself sufficiently to form a hook for the attachment of a rubber band; or a separate wire in the form of a hook can be soldered to the end of each of the wire clasps. In case the last molar tooth is not well erupted, the anchorage is strengthened by cementing to the tooth a collar with a slight metal lug on either the buccal or distal side, the lug being located on the collar so that it will project a little over the wire clasp, to prevent it from rising up when force is applied by the traction of the equalizing bands. When additional support of the appliance in the anterior part of the arch is required, a collar with a lug to project over the base wire can be cemented to one or more of the incisors. An appliance made in this manner is readily removed by the patient, by first pressing outward and backward the wire clasps with the finger, unlocking them from the lugs. This means of anchorage permits and insures thorough cleanliness of the apparatus and the teeth.

Fig. 7.

An appliance adjusted to the teeth of the upper arch is made similar to Fig. 7. When the teeth are regular, a lingual base wire is employed. If the teeth are irregular, the appliance is generally made with a palatal base wire anchored by partial clasps and spring-clasp attachments, and a wire clasp around each of the distal molars. A semicircular spring with U-shaped loops is arranged to pass in front of the incisors. To the semicircular spring are soldered hooks. The hooks are located opposite the canines, and attached to the wire just in front of the U-shaped loops. When there is a tendency for the apparatus to become dislodged by the downward traction of the equalizing bands, it is retained by cementing to one or more of the incisors, usually to the laterals, a collar with a slight lug on the

labial side, suitably shaped to support the semicircular spring. When the appliances are properly adjusted, one or more equalizing bands are stretched from the hooks of the lower appliance to those of the upper on each side of the arch, as shown in Fig. 8.

When the reverse traction is required, as in forcing outward the upper arch and inward the lower, it is generally necessary to adjust collars with lugs to the last erupted molars of the upper arch, as described, to assist the anchorage of the appliance, and to cement collars with lugs to the lower lateral incisors or canines for supporting the lower appliance. Many variations are used.

The cast here presented illustrates the position before treatment of the teeth of Miss R., age fifteen years. It was a

FIG. 8.

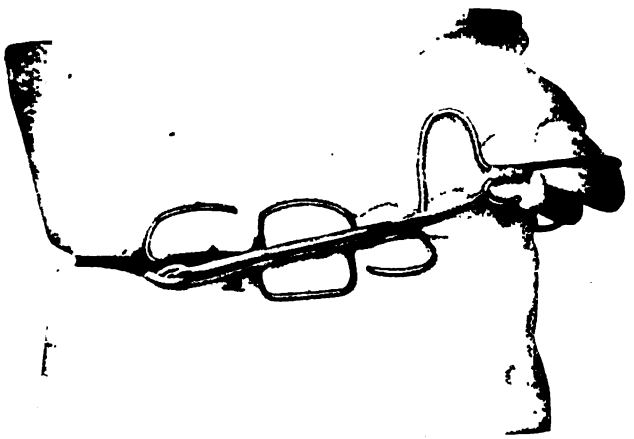
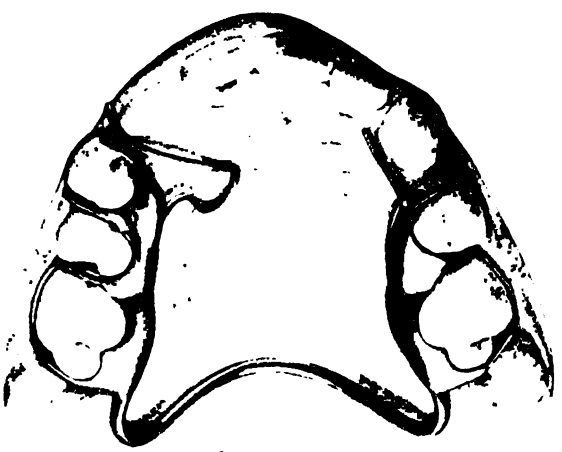


FIG. 9.



case of tardy development of the upper right canine. There was no prominence of the alveolar process to indicate the presence of the canine, but the accompanying X ray revealed the tooth in an impacted condition. The arch was too narrow and it was therefore expanded by an appliance with a palatal base wire, as illustrated in Fig. 9. The arms of the base wire were bent outward for expanding the arch laterally, and space for the canine was gained by moving the incisors laterally toward the left. For this purpose a looped spring was arranged to extend from the anchorage portion of the appliance on the right side opposite the palatal side of the first bicuspid, forming a loop about one-half inch long, projecting toward the median line and the end curved back to rest on the distal surface of the lateral. Force was exerted by opening the loop slightly once in two weeks. The casts show the change after four visits.

In making appliances partial clasps of gold are recommended; 18-karat gold plate or finer is rolled to No. 36 standard wire gage. When gold is used for partial clasps, gold solder is employed, or chemically pure tin for solder flowed with the soldering iron.

Wires for appliances should always be examined to determine that they are sufficiently springy and not brittle, as almost all springy metals, especially base metals, gradually deteriorate with age and lose their elasticity and become brittle.

Discussion.

Dr. R. H. HOFHEINZ, Rochester, N. Y. Dr. Jackson's paper dwelt particularly on his system and on his own methods. I am not as conversant with the methods of other orthodontists as I am with those of Dr. Jackson, and although I have used Angle's system I am now largely using the Jackson system, and I believe that to the general practitioner who does not make orthodontia a specialty the Jackson system probably offers less obstacles than any system known to me today. After one has acquired the dexterity which is necessary to make the appliances of Dr. Jackson, I think it is probably one of the most comfortable methods of regulating teeth, because the practitioner is not obliged to see his patients so frequently as with some other systems in use, as the spring force remains active.

I frequently use a plate instead of the base wire. I find there is less objection on the part of some patients to a very small plate with the spring attachment than to the heavy wire, which interferes at times with the movements of the tongue, especially where the arch is to be expanded. He speaks of using gold in connection with the crib or with the clasp. I invariably use German silver, and I find that after the German silver has undergone electric gold-plating the appliance will go for three months in mouths where the saliva is considerably vitiated, and with very little additional plating I have been able to use this very successfully. If Dr. Jackson had given to the profession nothing but the Jackson crib he would have given us a great deal, because that crib, which is made to embrace the molars as a rule, can be made of any size and is not only valuable in orthodontia but in prosthetic dentistry, especially for partial lower plates. The profession should be extremely grateful for it. I enjoyed the paper very much, and think that the book which Dr. Jackson has recently published is one of the best contributions to the subject of ortho-

dontia, and will always remain a standard work.

Dr. M. F. FINLEY, Washington, D. C. From a long and intimate acquaintance with the author of this paper, dating from my entrance into college, and with his work also, I have become familiar with his efforts to relieve humanity from the errors of heredity, environment, and disease, and noted the success he has attained in restoring to the form divine the beauty and symmetry which God intended each face should wear while traveling through this wonderful world.

Not enough interest is taken in orthodontia by the profession at large to place this branch of our professional duties upon the high plane it should occupy, and too much dependence is placed upon appliances already constructed and on sale at the dental supply houses for the welfare of the individual practitioner. This dependence upon purchasable ready-made appliances in orthodontia is as detrimental to the advancement of the profession as is the use of the prepared soft foods injurious to the stomachs of human beings, preventing as it does the normal amount of masticatory action which is so essential to proper digestion. If practitioners generally took enough interest in this work to construct their own appliances, and studied the cases sufficiently to be able thus to construct them, they would render better service to their patients and improve their own capabilities.

The system promulgated by Dr. Jackson more nearly meets the true ideal in orthodontic appliances than any I have used or seen applied, his system in my hands proving very satisfactory indeed, my use of it covering a period of several years. The ease with which the appliances are removed and cleansed, permitting also a thorough cleansing of the teeth and the mouth at the time of changing the pressure, is one of the strongest points in their favor, thereby being more hygienic and much less likely to cause injury to the teeth and soft parts than is the case with those appliances which are anchored to the teeth and not removable during the period of regulating. The use of metallic ligatures, as I have seen them applied, is certainly very injurious both to the teeth and the gums, impinging as they do upon the tissues in the interproximal spaces and dangerously affecting the attachment of the anterior teeth in their sockets by the natural diminution in the size of the root from the cervical margin to the apex, the tendency of the force applied being to elevate the tooth and in some instances to the permanent injury of the socket. In cases of neglect, where for any reason the patient does not return to the operator for the removal of the anchored appliances, the bands attached by nuts are left in the mouth, and in the masticatory process are driven under the gums, to their permanent injury and with serious results to the teeth as well. In the case of the Jackson appliance under these circumstances the whole appliance is readily removable.

As has been well said by Dr. Rolof B. Stanley, "The requisite qualifications in orthodontic appliances are efficiency, simplicity, delicacy, and inconspicuousness. *Efficiency* should receive the first consideration. . . . . *Simplicity* is next in importance. . . . . *Delicacy* applies to proportions. The freer the appliance is from bulk, the less it will interfere with the functions of the mouth, the danger of caries will be diminished, and the less will be the annoyance to the patient. *Inconspicuousness* is a

consideration, but should not be made paramount to the other qualifications." (*Cosmos* 1905, vol. xlvii, page 380.) Certainly the Jackson system of appliances is efficient, for they will accomplish in every instance what they were intended to perform, and their construction is simplicity itself. They can be made as delicate as any appliance consistent with adequate strength, and interfere as little with the functions of the mouth as any appliance in use.

Dr. E. S. GAYLORD, New Haven, Conn. I feel that I am not capable of discussing this paper, from the fact that I do not practice orthodontia in any form, for the reason that it is my good fortune to live within seventy miles of Dr. Jackson. For the past fifteen years I have induced patients that come to me requiring orthodontia treatment to place themselves in Dr. Jackson's hands, with results that have been most gratifying to me, and particularly so to the parents of these children, ranging from the ages of eight to fifteen and twenty. The number that I have passed into Dr. Jackson's hands I am unable to say, but to dissipate any thought that there may have been mercenary motives in my sending them to him, I will say that the matter of finance between myself and Dr. Jackson, or between the patients and myself, has never been broached. My interest in the matter has been for the interest of the patients, and in every case the results have been absolutely satisfactory.

That is all that I have to say with regard to the system of Dr. Jackson. There may be other systems by which as good results may be produced, but I am not familiar with them. I do know the results that are produced from Dr. Jackson's work, and I hope there will be no reason for discontinuing our pleasant relations, although I tremble to think of the time when Dr. Jackson will tell me that he has so many patients that he will be unable to look after mine.

Dr. F. MESSERSCHMITT, Rochester, N. Y. Were it not for the fact that I am thoroughly familiar with this method of correcting malocclusion of the teeth, I would feel rather reluctant about taking part in the discussion on a paper written by Dr. Jackson, who has devoted his life to perfecting this system for the benefit of our profession and of suffering humanity. Having seen so many cases that he has corrected for patients of various ages, I think it would be consuming too much valuable time for me to attempt any criticism on the appliances presented, as no doubt the casts plainly show what has been accomplished; and I will confine my discussion to the remainder of the paper, together with a few general remarks, trusting that they will assist in bringing out a better discussion.

For a number of years I have used this system almost exclusively in my own practice, with the most gratifying results, and with very little if any discomfort to the patient. In many instances young patients attending school wear appliances on both the upper and lower arch at the same time, which they are able to remove, thereby being able to keep their teeth and appliances in a perfect condition.

In many cases I use the same appliance for retaining the moved teeth, but in some cases I think a cement-attached appliance more advisable for holding the teeth firmly in the desired position, but it should be so constructed that the teeth and mouth can be kept in a perfect hygienic condition. My method of constructing appliances is very similar to that of the essayist. I use German silver and platinum-nickel wire, making the

partial clasps of gold-faced platinum, allowing the gold surface to come in contact with the teeth, and solder with chemically pure tin by means of the soldering iron.

When attempting to construct an appliance one should remember that a certain amount of time and skill are required to accomplish anything near perfection in dentistry. Failures in constructing these appliances are usually due to over-carving, or an inaccurate model; and the breaking of wires is caused by making sharp bends with flat in place of round-nose pliers.

I heartily agree with the essayist's views in regard to crown and bridge work. At the present time how eager the progressive members of our profession are to acquire knowledge and skill in porcelain dental art! not for the special benefit of their health, but because their patients demand it. Then why should not all practitioners have a thorough knowledge of orthodontia, even though at the beginning they attempt the correction of only the most simple cases? And would they not be better able to detect both local and constitutional causes in the early stages, thereby preventing the development of at least some of these cases? How many cases of irregularities present themselves, caused by the premature loss or extraction, or too long retention of deciduous teeth, or the unwise extraction of the permanent ones. We have prophylaxis and extension for prevention; now let us have prevention for malocclusion when possible.

Dr. M. L. Fay, Buffalo, N. Y. Dr. Jackson's appliances are certainly humane instruments for the correcting of these deformities. When both upper and lower arches can be expanded, the anterior teeth moved about in any desired manner, and all this accomplished without discomfort or inconvenience to the patient, it comes pretty close to being ideal. The removable feature of these appliances appeals to me greatly. They can be readily removed by the patient, the teeth and appliance thoroughly cleansed, and the mouth kept in a healthy condition. They interfere less with mastication and speech, and are less objectionable than fixed appliances.

Dr. Jackson speaks of his method of attaching collars to teeth where the reciprocal anchorage is to be used for equalizing the jaws. My method for making the attachment to the teeth is by using the spring-clasp attachment, placing a partial clasp on both buccal and lingual sides of the teeth, and then cementing this to the tooth. In this way I secure attachment without separation. The particular advantage of this method is where several teeth have to be banded, as for instance in the elevation of the bicuspids and first molars. Several thicknesses of metal would necessitate considerable separation. The spring clasp may have any attachment, such as hooks or lugs, soldered to it.

Dr. J. Lowe Young, New York, N. Y. I have listened to the reading of this paper with a great deal of interest. Not only Dr. Jackson, but a number of gentlemen who have discussed this paper, have spoken of "Dr. Jackson's system." In my estimation there is only one system of orthodontia, and that is not the Jackson system, any more than it is the Angle system, nor any other one man's system. Dr. Angle denies having a system. We are dealing with the science of occlusion. It matters not what appliances are used to put the teeth in occlusion, so long as they are effective.

One speaker made the assertion that

it is wrong for the profession to buy ready-made appliances for this work, and as much as said it is unethical to do so. I would like to ask that speaker if he forges his own pluggers and excavators, and cuts his own burs? A regulating appliance is an instrument used for a certain purpose, and if it can be made by skilled workmen, who do nothing else, in such a way that we can apply it in every case of malocclusion with better results (and I defy any of you to show better results than are being shown by the men who are using these ready-made appliances), I do not see any necessity for making them in the laboratory.

I will grant that Dr. Jackson can do a great deal with his appliances, but I claim there are better appliances for this work. By the use of the Angle appliances as now made the case is under one's control in every particular. If intelligently applied they do not press into the gums and cause irritation, but will do exactly what is demanded of them. If improperly used they will cause trouble and displace the anchor teeth and others as quickly as will any other appliance. In buying one of Dr. Angle's appliances brains are not furnished to enable one to properly apply it, any more than an excavator put in the hands of a tyro enables him to properly excavate a carious tooth.

To go back to some of the illustrations shown by Dr. Jackson, in which he attempted to draw one arch forward and the other backward by the compensating elastics—

Dr. JACKSON. I do not call them compensating. I use the word equalizing as a much better word.

Dr. YOUNG. I cannot understand how you have control of your cases with "equalizing elastics," as you call them, attached to the crib, as you use it.

Dr. JACKSON. The crib is an old system which I gave up long ago.

Dr. YOUNG. Well, with your up-to-date appliances I do not see how you have control of your cases. It is a well-known fact that in the movement of teeth they are much more easily carried forward through the process than they are carried backward. Take for example a case requiring the distal movement of all the upper teeth, without disturbing the positions of the lower teeth. The way Dr. Jackson has shown the application of his force, the upper teeth would be carried back but very little, while the lower would be moved forward. By using the clamp bands and the expansion arches, with the intermaxillary elastics, we have absolute control and are able to cause distal movement of one or both sides of the upper teeth, as may be required. How? Place the D bands on the upper second molars (if they have fully erupted) and so adjust the arch that when the nuts are resting against the tubes the arch is free from the front teeth. The lower arch is ligated to all the lower teeth anterior to the D bands. Thus all of the lower teeth will be firmly bound together as an anchorage against the upper second molars. The constant pull of the intermaxillary elastics will soon start the upper molars backward, and by an occasional turning of the nuts on the upper arch we are enabled to keep the arch free from the incisors and canines and thus to carry the molars as far back as may be required. The D bands should now be moved to the upper first molars and the same procedure be repeated, and so on, one tooth on each side at a time being carried back without disturbing the lower teeth. This, gentlemen, I claim Dr.

Jackson cannot do with his system, and I challenge him to show models of finished cases where he has so moved teeth.

Dr. W. H. WILLIAMSON, Aberdeen, Scotland I regret very much that I did not hear Dr. Jackson's paper, as I have always been interested in his methods as published from time to time, and took the opportunity of the voyage out to read his latest book on "Orthodontia." Judging, however, from the diagrams, the paper is mainly devoted to the subject of expansion of the arch. In his book he devotes considerable attention to the well-known Coffin method, where the articulating surfaces are covered—an objectionable feature—and proposes another form of spring plate to obviate that objection. Still, both he and Dr. Angle seem generally to expand the arch by pressure confined to the teeth themselves, so that in many cases they present the appearance of being splayed outward, leaving the upper part of the arch as it was. Being only a general practitioner, and a mere dabbler in orthodontia, it may be presumptuous in me to express an opinion, but it seems advisable in most cases to carry the process along with the teeth, and in that way stimulate to a greater extent the development of the parts forming the floor of the nose, producing a full round palate from the beginning. To effect this general expansion I have met with no better or simpler method than one introduced some years ago by Mr. Stanley Read of Brighton, England. It consists of a stout screw of fifty threads to the inch, which moves within a piece of gold tube to correspond. To the tube, and to one end of the screw, are soldered metal tags to hold them in place in the vulcanite. The palate is covered with a wax plate in the usual way, without attachments to the teeth. The tube and screw are sunk in the wax at the top of the palate, so that the tagged ends will be covered, and the plate is vulcanized.

It may be inserted in the mouth for a day or two, and then be sawed up through the middle so that one half will hold the end of the tube and the other the end of the screw. To widen, the patient has merely to hold one half and turn the other right around, producing an exact increase of width with each revolution. If you have a patient who from whatever reason cannot return for two or three months, you may direct him to give the plate one turn each week or so. I show you here casts of the case of a patient thirteen years of age, where the appliance was put in the mouth and was not seen again for three months, the condition of the arch being then very much improved. You will observe that the thumb can be placed quite freely on the top of the palate in the cast. I have used this method in several cases, and find it very efficient, while children take a certain amount of pride in managing the plate themselves and carrying out your instructions. Dr. Jackson seemed to think it was rather simple, the dentist's part being reduced to a minimum, but I do not think that a very serious objection, especially in the circumstances that I have instanced.

The last speaker referred to the advance of orthodontia, and in that respect I think the dental world is very much indebted to America for the strenuous endeavor its leading exponents have made of late years in laying down sound scientific lines on which practice can safely proceed. At the same time I cannot agree with the broad statement that all cases of irregularity should be turned over to an orthodontist, and the

illustration of the family doctor not being thought the proper person to perform an operation for appendicitis is far too extreme a case. The general practitioner should be able to treat the simple diseases of various organs, and so also the dental graduate should know, among other things, the general principles of orthodontia, and like his medical brother be able to decide whether he is competent to treat the case himself or ought to turn it over to the specialist.

Dr. V. E. BARNES, Cleveland, Ohio. I have been very much interested in this paper of Dr. Jackson's and have been benefited by it. Many of his methods and appliances are valuable and efficient, as I have proved in my practice. But I cannot agree that he has a "system." As I understand it, a system is a regularly organized plan which one can pursue to obtain results in any and all cases. What has been shown today is but the fraction of a system in which expansion seems to be the main and predominant feature. Expansion is not the whole of orthodontia by any means, and I do not believe the essayist's methods are flexible enough to do all that is required, or to do it in the most efficient manner. The results shown are good as to the amount of movement, but do not seem complete or finished. The statement made that by the methods shown the essayist could operate six times as fast as could any other man with any other method is far beyond reason. For instance, many orthodontists see from fifteen to twenty or more patients a day. Does it seem likely that Dr. Jackson can attend to ninety or one hundred and twenty a day and make all changes and adjustments he finds necessary? I find that the time needful to adjust various appliances is but a fraction of the time required to study and watch cases. It is not so much the kind of apparatus, but the quality of brainwork expended. Some men will get better results than others from appliances, but the best results in the long run will be obtained by the skilful use of different methods for the different conditions met with. Well-shaped teeth will retain a removable appliance and give good service, providing the patient be one who will not remove appliances as soon as your back is turned. For partially erupted teeth, the removable spring appliance has proved a failure in my hands, and I question its success in such conditions in the hands of any man.

As to the general practitioner carrying on orthodontia cases: No one can justly condemn this if he does it correctly, but the evidence today shows that he generally does not diagnose accurately or correctly, and consequently cannot treat correctly. He is not willing to spend the time and pains that the specialist finds necessary. Is it therefore any wonder that he often fails? Our friend from Scotland has said that a patient going to the general medical practitioner with an inflammation of the eye would receive treatment from him *if he knew what the trouble was,* and if it were simple. Here is the key to the situation—*knowing and diagnosing.* The trouble comes in not knowing, or in failure in diagnosis—all of which may be due to not keeping abreast of everything. No man can do all or know everything, hence the reason for the existence of the specialist in all the walks of modern life.

Do not interpret my remarks to mean that I see no good in the essayist's methods, for that is not so, rather take it that his methods seem good for limited procedures, just as all other men's methods or so-called systems are limited—

none of them the best for all cases, all of them the best in some special and definite instances.

Dr. JACKSON (closing the discussion). I am glad to hear such kind remarks regarding my system of regulating; however, as one speaker has said that there is no such thing as a system, I want to state that I claim to have built up a complete system of regulating, by which the teeth and alveolar process can be moved in any desired direction, and that it meets the requirements in every case presenting. I have made it my life-study to improve the methods of correcting teeth, and for over twenty years have been giving the profession the benefit of my work in the way of public demonstrations, papers, etc., starting out with the methods then in use.

Malocclusion has been referred to as the essential point for discussion. What is orthodontia, technically, but correcting malocclusion or faulty positions of the teeth? What have I been trying to accomplish all of these years, if not the improvement of the occlusion, or the forcing teeth into correct position? I labored for years in regulating teeth by the use of ligatures, bands, screws, etc. They were so uncleanly and so uncomfortable to the patient, their application and care so laborious, that I was led to study out simpler methods that are cleanly and comfortable. Those who will not apply these valuable improvements will spend extra time unnecessarily in regulating.

I am suggesting that you multiply your capacity. Instead of seeing a patient six times a week, or less, by my methods it is generally only necessary to see them once a week at first, and later once in two weeks.

Dr. Young says that I cannot move a single tooth. Why can I not move a single tooth by my system, as well as all of the teeth. I have shown how I move the whole arch by the equalizing elastics. I have here the cast of a case in which, in eight visits, all of the incisors and one canine were moved laterally toward the left, the width of one of the canines. By my system one can move a single tooth in any direction, or two or three teeth, or the whole arch, and I show you how it is done more simply, I consider, than it has been done before. Dr. Young tells me that I cannot move the teeth backward, and I show him how I have moved the molars, bicuspids, or canines backward in the line of the arch, as well as moving the incisors. Some practitioners would like me to say that I never extract teeth for regulating. I only extract when from careful consideration of the case I find it necessary, always trying to best serve the patient.

In regard to the general practitioner and his work, I think it best for him to understand orthodontia, getting all the information he can on the subject, in order to be of benefit to his patients. It should be taught thoroughly in the dental colleges. I was among the pioneers to recommend that every practitioner should understand how stenosis causes irregularities of the teeth. (See *Cosmos* 1890, vol. xxxii, page 292.) I stated that every dentist should be capable of diagnosing a case and knowing whether the irregularity was caused by stenosis due to adenoid growths, deflection of the septum, enlarged tonsils, mouth-breathing, etc. The general practitioner must have this knowledge of the general etiology in order to be able to advise his patients. In the smaller towns at least, the general practitioner has to deal with cases of orthodontia, and I have per-

fected a system by which he can do this and not take up so much of his time as to exclude them from his practice. These cases should be looked after, and I have tried to show that an apparatus which requires the patient to be seen but once a week, or even less frequently—never more than twice a week—has a great advantage over methods that require the patient to be seen every one, two, or three days. I never feel alarmed when a patient comes into the office and tells me that he is going to Europe the next week. I simply tell him to keep the appliance in place, removing it to cleanse the teeth and appliance thoroughly at proper intervals, and when I see the case again the teeth and appliance are generally in good condition.

The subject of Dr. Jackson's paper was passed, and the chairman announced as the next order of business a paper by Dr. L. S. CHILCOTT, Bangor, Me., on "Obstetrical Deformity of the Mandible," as follows:

Obstetrical Deformity of the Mandible.

By LANGDON S. CHILCOTT.

IT is not my object in this brief paper to discuss methods for correcting the various irregular forms in which we find the teeth arranged in the human jaws, nor is it my purpose to criticize methods employed by members of the medical profession in the practice of obstetrics; but it is my hope in opening this subject that we may in time determine the cause of this deformity of the mandible, which I believe occurs at birth.

It is true there are no records, as far as I have been able to learn, to support this theory, nor do I know of anything having been written on this subject; but. in the absence of data, I believe we are justified in assuming that this marked and similar deformity of the mandible in a small percentage of patients must be due to some common cause. Those patients whose jaws are in the condition which I will try to describe are not, as a rule, aware that their mandibles are different in shape from those of their friends and acquaintances. They do not think it strange that only their posterior teeth articulate. They have often noticed an inconvenience in being unable to cause the lower incisors to reach the uppers.

FIG. 1.

When we examine the mouth we find a condition similar to that shown in Fig. 1, which was made from casts and articulation taken of the teeth of a young lady fourteen years ago, and which shows the characteristic articulation in this deformity. It will be seen that although the patient in closing the mouth is able to

bring together only the second molars of the maxilla and mandible, yet the teeth are all of normal size and have a natural position in the jaws.

It is an *unnatural relation of the maxilla to the mandible,* and not the position of the teeth in the jaws, that established this condition; and it is caused by the straightening of the mandible at the angle. We may find associated with this condition any of the forms of irregularities, and the patient may, as a means of establishing the most satisfactory bite, acquire an unfortunate habit of protruding the chin, as explained by Drs. Baker and Howe of Boston.

But these features are entirely independent of the real issue. When we have the patient close the mouth, and we examine the side of the face, the absence of a pronounced mandibular angle is noticeable. Fig. 2 offers a good illustration of this feature, showing almost a straight line from the point of the chin to the middle of the ear. The chin is carried slightly forward. There is a marked thickness of the lower lip caused by an excessive muscular development induced by the effort to close the lips in articulation.

The history of this case shows that the patient as a child was slow in learning to talk, and that in his early boyhood days articulation was difficult with him. A figure showing the articulation of his teeth would have been shown had I not ground his posterior teeth to improve the bite before it occurred to me that the case might be of special interest.

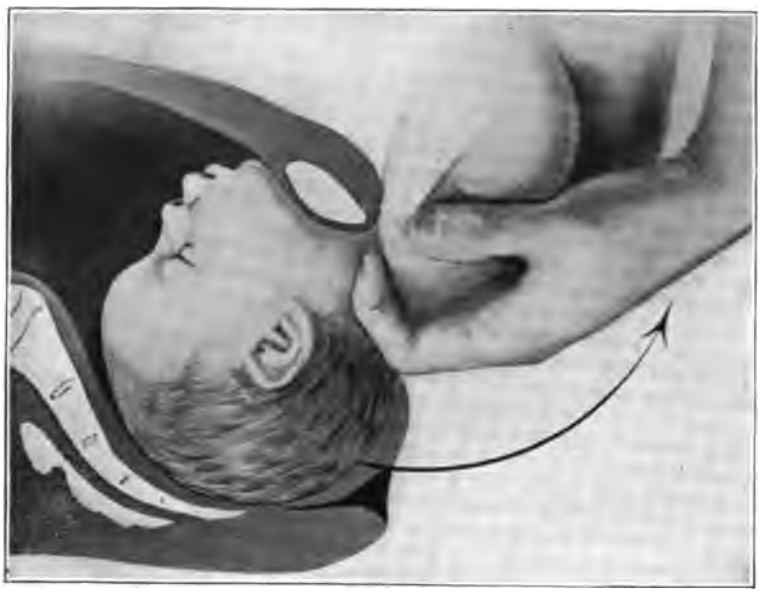
Fig. 2.

This young man is a personal friend of mine, and it was a statement of his mother's that first caused me to think that this condition was caused by an injury to the mandible at birth during the last stage of labor.

On reference to a text-book of Professor Williams, who occupies the chair of obstetrics in the medical school at Johns Hopkins University, we find it estimated by comparison of different authors that the uterus exerts a force in labor of from 16.73 to 577 lbs. Again from Professor Williams, quoting roughly, we find as to the frequency of the various presenta-

tions, based on several hundred thousand full-term cases, that 97 per cent. are of vertex presentation and 3 per cent. of breech presentation.

Fig. 3.



—*Williams.*

It is the birth of the head alone that concerns us here, and Fig. 4 shows the distortion which the head may undergo in a vertex presentation, due to the elasticity of the bones and unossified sutures. Mention is made of the change in shape of the cranial bones, but I find no reference in this connection to the mandible, which must suffer distortion and may not return to a normal shape.

I wish now to call attention to a form of breech presentation, to illustrate how the mandible may suffer permanent injury. Professor Williams says that in the vast majority of cases the back of the child eventually rotates toward the front, no matter what its original position; but when it does not take place spontaneously the movement may be induced. When, however, this is impossible, delivery must be attempted with the head in the abnormal position by the employment of traction, as illustrated in Fig. 3. Two fingers of one hand grasp the shoulders while the other hand draws up the feet over the

Fig. 4.

—*Williams.*

abdomen of the mother. As a result the occiput of the child is born first and the

perineum is subjected to greater liability of rupture.

To more fully realize the danger of injury in breech presentation it must be understood that death to the child from asphyxiation is almost inevitable if the head be not delivered in less than eight minutes after the appearance of the umbilicus at the vulva.

Trusting the members of the association will study the history of all cases of this deformity which may come to their notice, and give their brother practitioners the benefit of their research, I leave the subject to your consideration.

Discussion.

Dr. M. H. CRYER, Philadelphia, Pa. It gives me great pleasure to have heard this paper, and I must congratulate Dr. Chilcott on his observations. It is gratifying to know that we have men in the dental profession who in the studies of the deformities of the mandible place the trouble at so early an age as he has done. In fact I think for certain conditions of deformity we might begin with the embryo. Therefore I congratulate the essayist for bringing this matter before us, although I may not agree with his conclusions entirely.

The essayist speaks of the jaw being straightened at the time of birth. I think that is an error, for this reason: the mandible at this period is already straight or nearly so. Take a normal mandible: A line from the condyloid process to the symphysis is almost a straight one. Therefore I do not believe that in the case he speaks of it is straightened through the action of birth, because it is already straight. Further than this, the mandible is the hardest substance in the body at that time. A pressure on the mandible would cause other structures back of the condyloid process to give way first. Now, in Fig. 2, he shows a straight bone. It is possible that we can have an injury at the time of birth by delivery either with the forceps or without them, but particularly with them, and in the case the essayist speaks of I believe that the bone was injured in some way or other so that the proper development of the mandible was prevented.

There is another class of cases in which the whole mandible is carried forward until the condyloid process rests upon and articulates with the eminentia articularis. I have specimens showing a bilateral condition of this kind. During this meeting Dr. Howe of Boston has shown me pictures illustrating where the condyles rest upon the eminentia articularis on both sides. This condition I believe could be induced at the time of birth by injury with the forceps and if the jaw had been carried forward the physician should have examined it carefully to see that the mandible was carried back to its proper position.

Dr. CHILCOTT (closing the discussion). In reply to what Dr. Cryer says about the straightening of the bone, it was not my intention to say that the mandible was straightened at birth, but deformities of this kind are generally conceded to be due to the straightening of the jaw at the angle. I believe the jaw is sometimes injured at birth, and that it never again resumes its normal position. It is true that in infancy the mandible has no perceptible angle, and that it is the most fully developed bone in the body, and I think it is not unreasonable to assume that it may sustain what is called a "green-stick" fracture, and nothing oc-

curring to draw the attention of the physician to it, it may be allowed to go on and never be replaced in the normal position.

The subject of Dr. Chilcott's paper was passed, and the chairman announced the adjournment of the section until 8 P.M.

SECOND DAY—Evening Session.

Section I was called to order at 8 o'clock on Wednesday evening, by the chairman, Dr. T. P. Hinman.

The first order of business as announced by the chairman was the reading of a paper by Dr. B. L. THORPE, St. Louis, Mo., on "Pioneer Manipulators of Gold Foil."

[This paper (from Section II) was read in this section on account of the special convenience of the meeting-place. In this volume the paper and discussion will be found printed in Section II.]

The next order of business was the reading of a paper by Dr. A. L. MIDGLEY, Providence, R. I., on "Infectious Diseases of the Mouth."

[This paper (from Section III) will be found in report of Section III.]

Motion was made and carried that Dr. Midgley's paper be passed without discussion, as there were a number of matters to be transacted during the evening session.

The chairman then announced as the next order of business a paper by Dr. W. STORER HOW, Philadelphia, Pa., on "Some Phases of Crown and Bridge Work," as follows:

Some Phases of Crown and Bridge Work.

By W. STORER HOW.

FELLOW members of Section I, N. D. A., Buffalo meeting, 1905: Accepting the earnest invitation of your chairman, Dr. T. P. Hinman, I have the honor to present a paper on "Some Phases of Crown and Bridge Work."

The object in view is to graphically exhibit some typical forms of *pier-span substitute bridges* that since 1869 have been described and depicted in the *Dental Cosmos,* and the electrotypes of which may be available for the pictorial presentation. Had time and opportunity permitted, other accessible illustrations might have been included, to give the paper a more completely illustrated aspect. The journal mentioned is implied in all the references, and space-economy compels editorial brevity of description; the figure numbers are those of the present paper. With the illustrations in view, the skilled dentist can usually supply details of constructure or modify the examples shown, while the references will enable the inexpert to "read up" on the subject.

In the plan of this paper its purposes were—

First: To collectively recall and record some phases of the early and later developments of special forms of dental substitutions which have resulted in a distinct department termed "crown and bridge work."

Second: To group and graphically portray the progressive devices so begun and combined that the expert dentist of today, and the future, may readily utilize, partially or completely, these ingenious practical prosthetic products of his predecessors.

Third: To suggest an avoidance of the procrastination that awaits an occasion for essays of epitaph, and fanciful floral decorations, and funeral directors' ceremonies following the demise of the dear departed; whereas a due modicum of present praiseworthy taffy, and a few bright flowers of speech, would warm the cockles of the heart in our contemporary benefactive inventors who have honored our profession as special curators and guardians over the gateway for the sustenance and speech of the crowning creation, Man.

THE BING BRIDGE.

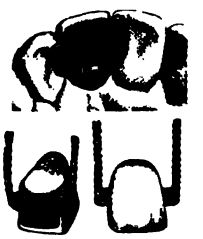
Dr. B. J. Bing, Paris, France (October 1869, p. 509), originated the pier, span, and stop bridge, which for a central substitute requires—Cut cavities in the near central and lateral with two little griffes (stops) soldered to the sub backing, the stops of which are with gold foil stopped into the pier cavities. The bridge "is solid, stationary, and can be cleansed as well as the natural teeth."

(The writer prefers "substitute" to "dummy," and for brevity uses the abbreviation "sub" as the substitute tooth-crown unit.)

Dr. M. H. Webb, Lancaster, Pa. (June 1873, p. 291), shows in Fig. 1 a pier and saddle-span to rest on the gums and be soldered to the two-stop backing of the sub central to form a modified Bing bridge.

FIG. 1.

FIG. 2.



Dr. Webb furthermore (December 1879, p. 668) shows a like bridge having stop posts for the canals of the left central and right lateral. (See Fig. 2.)

FIG. 3.

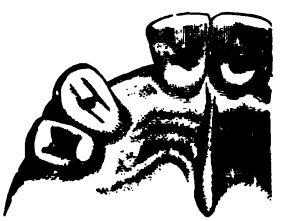


FIG. 4.

FIG. 5.

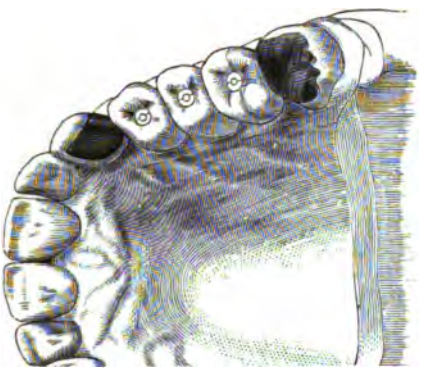
FIG. 6.

Dr. Wilbur F. Litch, Philadelphia, Pa. (August 1880, p. 396), illustrates by Figs. 3 to 6 his wing-plate and pier-post, or pin-plate bridges.

Dr. H. C. Register, Philadelphia (May 1881, p. 260), describes a die-struck saddle to which are soldered stops and screw-with-nut posts, Fig. 7. After the saddle-span stops have been fixed in the piers, the perforated porcelains are removably mounted; Fig. 8 shows one such bridge.

Fig. 7.

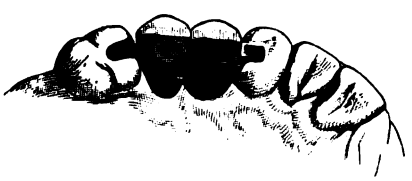
Fig. 8.



Dr. M. H. Cryer, Philadelphia (July 1882, p. 360), illustrates the backed and

Fig. 9.

Fig. 10.

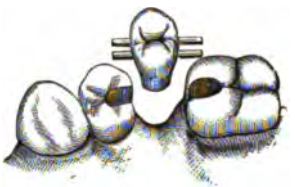


soldered two-stop saddle and pier post, modified Bing bridge, shown in Figs. 9 and 10.

Dr. E. T. Starr, Philadelphia (August 1887, p. 539), shows in Figs. 11 and 12 the four-stop porcelain tooth that remedies a radical defect in the two-stop sub,

Fig. 11.

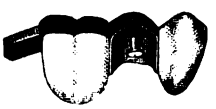
Fig. 12.

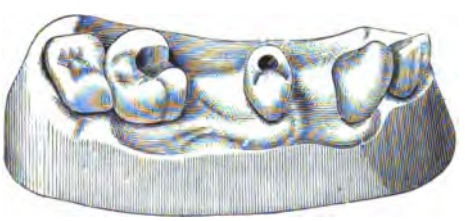


which is liable to rotation on its trunnion-like stops; whereas these duplex stops maintain the verticality of the sub in its stopping relation to the piers. Furthermore, these platinum stops provided for union by baked body or by solder to form clear span or saddle-span bridges of every Bing type.

Fig. 13.

Fig. 14.





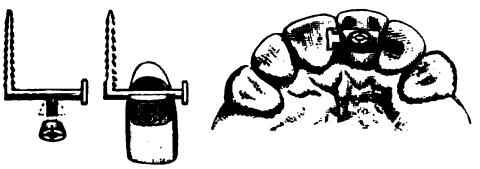
Dr. J. Leon Williams, New Haven, Conn. (January 1884, p. 6), shows in

Fig. 13 a Bing-stop, two-sub, and cap-crown bridge.

Dr. Wilbur F. Litch, Philadelphia (March 1886, p. 136), in Fig. 14 exhibits a Bing-stop sub, hood with headed pin, and arm-span bridge.

Dr. James B. Hodgkin, Baltimore (April 1886, p. 207), illustrates by Figs.

Fig. 15. Fig. 16.



15, 16 a Bing-stop, sub-span, pier-post and screw-with-nut bridge.

Dr. E. Parmly Brown, New York (September 1886, p. 584), shows in Fig. 17 a Bing-stop baked-body sub; and in

Fig. 17.

Fig. 18.

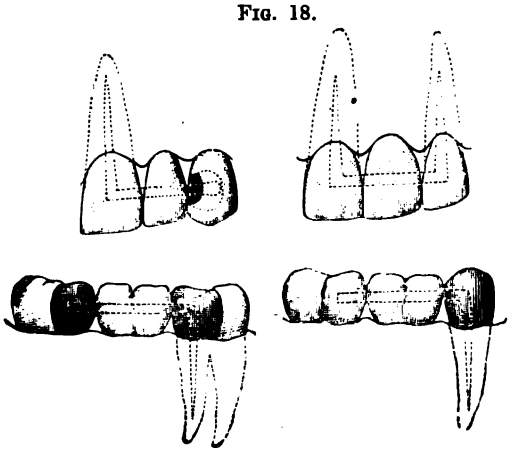


Fig. 18 exhibits three styles of Bing-stop porcelain sub, and canal-post, pier-span bridges.

(At the meeting of the Pennsylvania State Dental Society in Philadelphia June 28, 1905, Dr. Brown showed, in the mouths of two patients, Bing bridges of the Fig. 18 type and date.)

Dr. J. Rollo Knapp, New Orleans (February 1887, p. 82), illustrates in Fig. 19 a Bing-stop and Richmond crown two-sub bridge.

Fig. 19. Fig. 20.

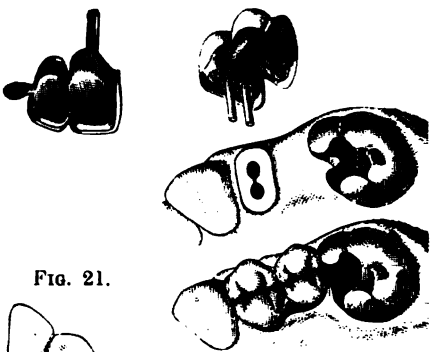


Fig. 21.

Dr. Sidney S. Stowell, Pittsfield, Mass. (December 1888, p. 910), shows in Fig. 20 a Bing-stop gum-saddle Richmond crown, two-sub bridge; and in February 1891, p. 132, Dr. Stowell illustrates a Bing-stop porcelain two-sub saddle and socketed span for pier post, and pier-stopping fixation, Fig. 21; this bridge "was not more than thirty minutes in the making."

Dr. Stowell (April 1900, p. 354) furthermore shows in Fig. 22 a canine pier having a large gold filling socketed for a vertical pin on a shouldered extension of

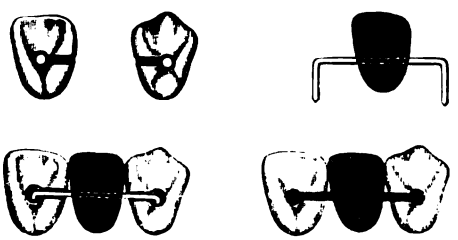
the two-sub span, and a cap crown for the molar pier, to which the bridge is ce-

FIG. 22.

mented, leaving the pier pin free for "slight vibrations with the other teeth."

Dr. M. L. Rhein, New York (May 1903, p. 371), shows in Fig. 23 a type

FIG. 23.



of Bing-stop canal-post bar-sub bridge work for the fixation of piers loosened by pyorrhea alveolaris.

RICHMOND CROWN AND BRIDGE WORK.

Dr. J. Leon Williams, New Haven, Conn. (January 1884, p. 1), says: "As the single crown is the beginning and the end of all bridge work, a description of that particular form which is of the greatest practical value will be necessary. This is known as the Richmond crown, though not the crown he claims as his invention. It consists essentially of three parts—a pin [post?] which enters

FIG. 24.

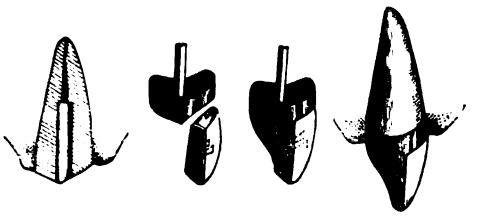


FIG. 25.

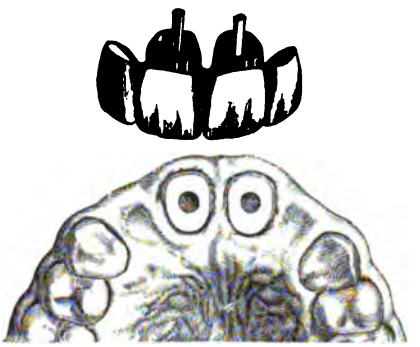
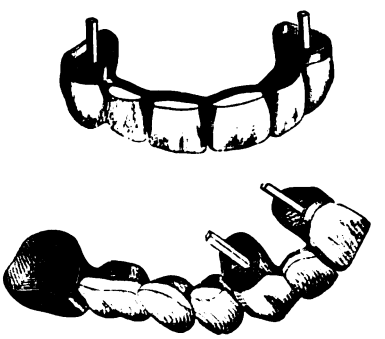


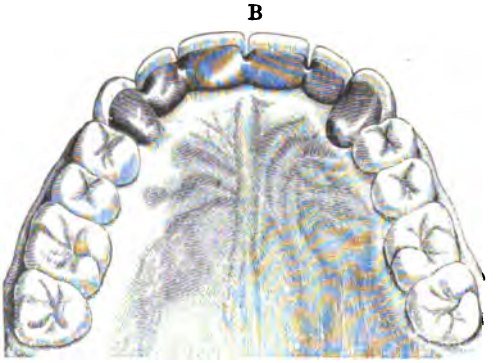
FIG. 26.

A



—*Williams*, Dec. 1885.

B



the enlarged pulp-canal; a root-cap of gold; and a porcelain face, which is the ordinary plate tooth." (See Fig. 24.)

On pages 2 and 3 he shows in Fig. 25 a Richmond four-sub bridge, the lateral subs being of the wing-extension type. At page 4 he illustrates in Fig. 26, A and B, a characteristic six-anterior-sub Richmond and pier-post bridge.

Dr. J. L. Williams, Philadelphia (December 1885, p. 710), shows in Fig.

Fig. 27.

27 a collared-hood, three-sub span, and cap-crown bridge.

Dr. J. L. Williams, Philadelphia (December 1885, pp. 712, 713), shows

Fig. 28.

a Bing-stop, wing-end, coupling-bar Richmond bridge of remarkable configuration, by Figs. 28 and 29.

Dr. Williams furthermore on page 711 appreciatively illustrated in Figs. 30 and 31 a remarkable combination Richmond cap-crown and wing gum-rest bridge made by Dr. H. A. Parr, New York.

Fig. 29.

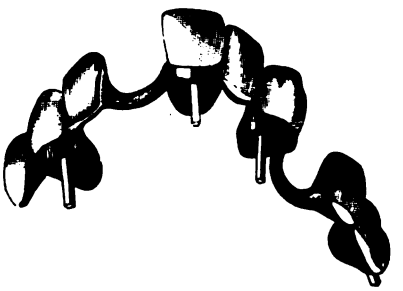


Fig. 30.

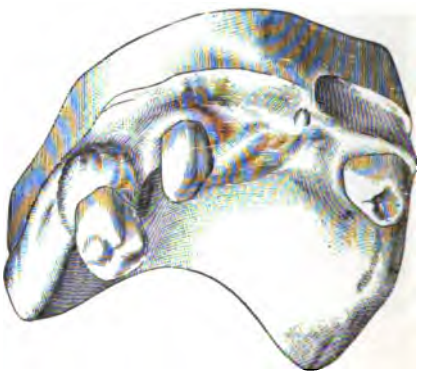


Fig. 31.

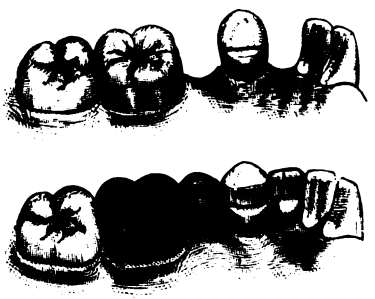
Dr. Wilbur F. Litch, Philadelphia (March 1886, p. 135), shows a half hood and pier-pin three-sub span and cap-crown fixed bridge, Fig. 32.

Dr. G. W. Melotte, Ithaca, N. Y. (December 1886, p. 746), shows a cap-

FIG. 32.

crown, one-sub, shoulder-pier, wing-sub bridge, Fig. 33.

FIG. 33.



Dr. J. Rollo Knapp, New Orleans (February 1887, p. 82), shows a Rich-

FIG. 34.

mond crown fourteen-sub, cap-crown headed-pin, second molar pier and canine canal-post anchorages, Fig. 34.

Dr. W. E. Griswold, Denver, Colo. (September 1889, p. 743), shows in Fig. 35 cusp-caps with pins for socket anchor-

FIG. 35.

age in live piers. He illustrates many forms of this style of bridge work, applicable to all anterior and posterior teeth.

Dr. G. L. Curtis, Syracuse, N. Y. (February 1890, p. 110), illustrates, by

FIG. 36.

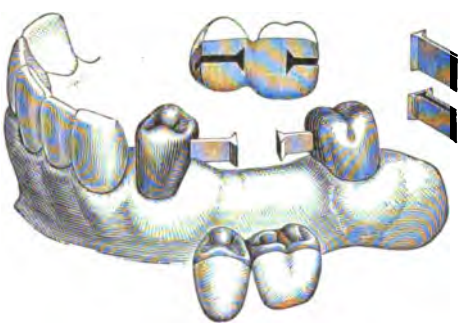
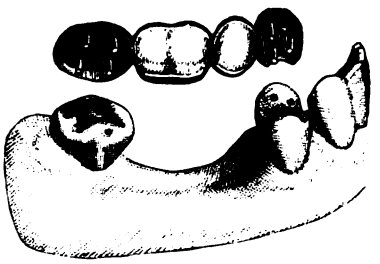


Fig 36, cap crowns having soldered stops to be cemented in like sockets soldered in the backings of the subs.

Dr. C. L. Alexander, Charlotte, N. C. (October 1896, p. 852), illustrates in

Fig. 37 his method of preparing the live piers with retaining sockets for corre-

FIG. 37.



sponding pins in cast caps, or hoods, to which the subs can be soldered to form a bridge like that of the figure.

Dr. J. Leon Williams, London, Eng. (August 1900, p. 736), shows in Figs. 38 and 39, a three-sub span united by

FIG. 38.

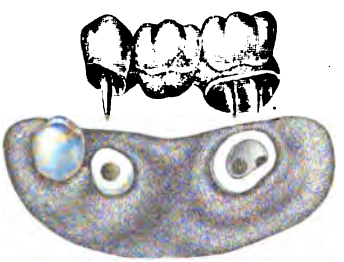
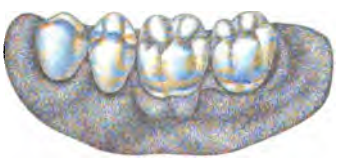


FIG. 39.



baked body and gum, and having canal-post pier-fixation by cement.

In all the modifications of crown and bridge work thus far illustrated, the pier-fixation or anchorage has been designed for permanency.

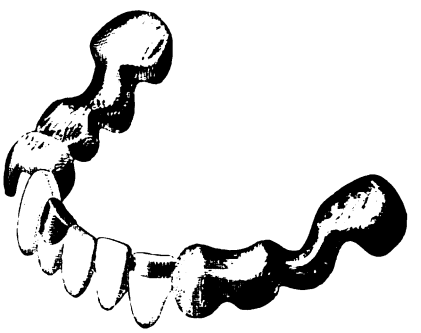
Bridges of the Richmond type, like those of the Bing type, are fixed on their piers more or less securely to prevent displacement in use. Several disagreeable consequences ensue, chief among which are the malodorousness, caries-cultivating, disease-developing effects of food and mucous decompositions under and over the bridge crevices and between the natural teeth.

Difficulties in repair or removal by the dentist are disappointing to the patient and disreputable for the practitioner. Hence the persistent endeavor to devise crown and bridge work that may be removed and replaced by the patient.

REPLACEABLE CROWN AND BRIDGE WORK.

Dr. James E. Dexter, New York (July 1883, p. 346), illustrates his replaceable bridge, the details of its construction requiring about four pages of descriptive

FIG. 40.



matter which two illustrations could reduce to a page. He strikes or shapes caps to fit the piers, and slits one side of each cap to produce a spring grip on its pier. He then connects the caps by span bars to which the subs may be attached in any usual way. The bar-cap union must not interfere with the cap slits to destroy the cap-spring grip on the piers to per-

mit frequent displacements and replacements for its cleansing, and for the cleansing of the natural teeth and gums. (See Fig. 40.)

FIG. 41.

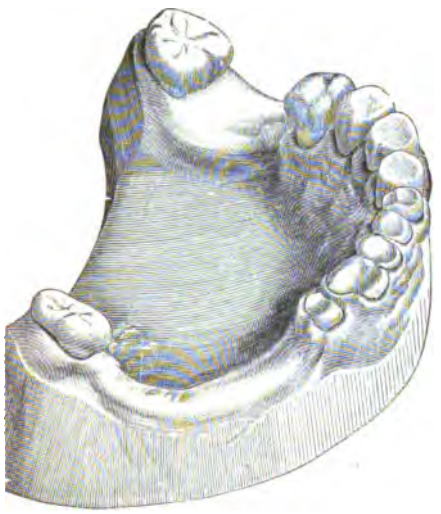
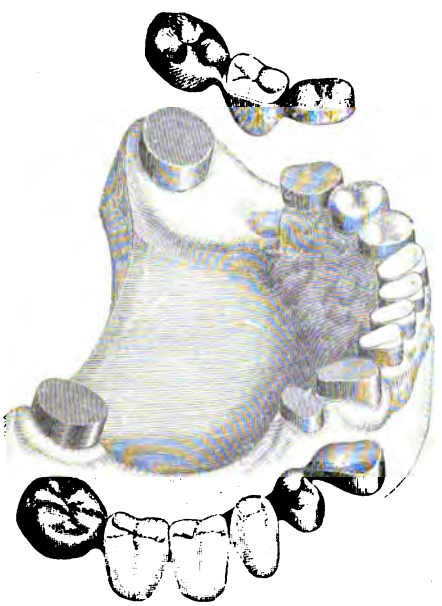


FIG. 42.



Dr. R. Walter Starr, Philadelphia (January 1886, p. 17), under the title "Removable Bridge Work," shows in Fig. 41 the cast of a case presenting difficulties of an unusual character, "the molars and left second bicuspid overhanging to a degree that would make the taking of an accurate impression by ordinary means well-nigh impossible." In Fig. 42 are shown verticated flat caps cemented tight over the molars, left second bicuspid, right first bicuspid, and canine stump. Gold cover-crowns were made to telescope over all the caps. The two completed bridges were easily replaced on or removed from the supporting capped piers. Dr. Starr is to be credited with this early and complete example of the telescoping fixed cap and cover-crown bridge—as now made, to be removed and replaced by the patient, although Dr. Starr then thought it expedient to employ a connecting film of gutta-percha for heat removal to repair. The further ingenious prosthetication of the anterior stumps, by fitting them with collar-cups, and setting in them, with gutta-percha, porcelain cusps, was a remarkable restoration to utility which is very well depicted in the illustrations.

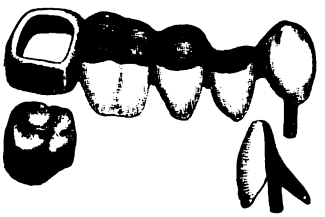
FIG. 43.

In August 1886, p. 498, Dr. Starr illustrated by Fig. 43 a difficult fixed cap and cover-crown replaceable bridge, with the roof-cap pier and socket tube for the

post of the roofed canine sub; the span being composed of united saddle cups carrying cemented porcelain cusp crowns.

In the same article, p. 500, he credits Dr. C. M. Richmond, New York, with the removable structure shown in Fig. 44; in

Fig. 44.



making which Dr. Richmond employs a zinc die made from a cast of the pier tooth with its cap on. The illustration also shows his post and roof device in another form than that previously described.

Dr. Richmond, therefore, seems to have originated the roof-shaped root-end, which, with its roof-plate and tube for the post of the roof-conforming crown, shown by Fig. 44, constitutes the present preferred pier anchorage for oral-span removable bridges. By this means the gleam of the gold collar and its pericemental perversion of the natural pier are prevented.

Dr. J. L. Davenport, New York (November 1887, p. 671), shows in Fig. 45 fixed capped and tubed canines, and left bicuspid root cap-crowned. In Fig. 46 is seen the clasped and winged saddle plate, telescoping posts, and cover-crowns, forming, with the eleven subs, the doctor says, "the most perfectly fitting piece I ever inserted, requiring great care for its removal, and yet, by a little practice, the gentleman was able to remove and replace it quite easily."

Fig. 45.

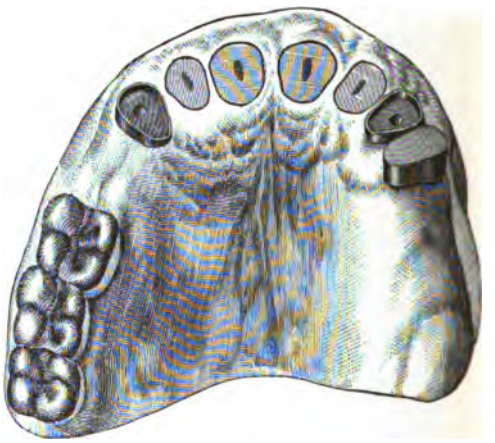


Fig. 46.

Dr. R. Walter Starr, Philadelphia (February 1888, pp. 66, 67), shows in Fig. 47 an ingenious and successful Richmond saddle denture. A thing miscalled a bridge had wrecked the roots of the long-suffering and stench-sickening patient, past eighty years in age, but who still pleaded for another attempt at restorative substitution.

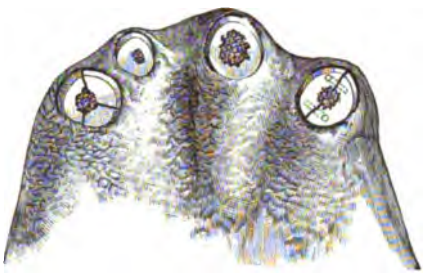
When some recuperative progress had been made, the left canine was found split nearly its length. It was wound and bound with fine wire; anchor screws obliquely placed held the parts together, and the wire ferrule was replaced by a tight collar. The right canine had been

thrice split, and the mesial portion came away: a like die-struck pure gold plate with headed pins in its convex surface was wire-ferruled in place, after the canal cavity had been undercut with burs. (Fig. 48.) Dry amalgam was packed in the cavity and around the pin-heads. Subsequently the wire ferrule was removed, the splint and root collared, and a post-hole drilled. After six curative weeks the fitting of the lateral and central subs with caps and posts and the fitting of telescoping caps over the canine collars were proceeded with, and short saddles struck to fit the gums behind the canines. The completed bridge is shown by Fig. 47.

A piece of lower bridge work over the much-abraded anterior teeth completed the structure, which after more than a year's use had occasioned no discomfort and was enthusiastically appreciated as a practical prosthetic achievement.

Fig. 47.

Fig. 48.



Dr. George Evans, New York (December 1888, p. 887), illustrates, in Fig. 49, cap-crown piers having gingival stops, to limit the thrust of the telescoping collars coupled by the gum-saddle span on which the subs are mounted to complete the replaceable bridge, Fig. 50.

Fig. 49.

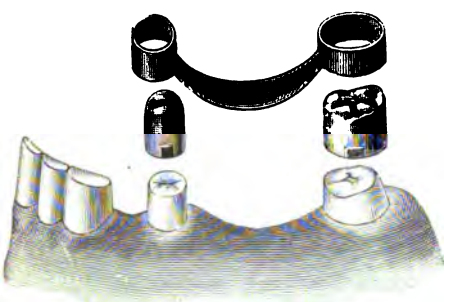
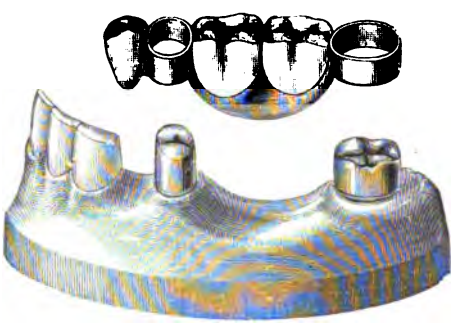


Fig. 50.



Dr. H. A. Parr, New York (March 1889, p. 173), shows in Figs. 51 and 52 a removable saddle structure replaceably secured by boxed lugs and sockets to lower molar and bicuspid piers.

Fig. 51.

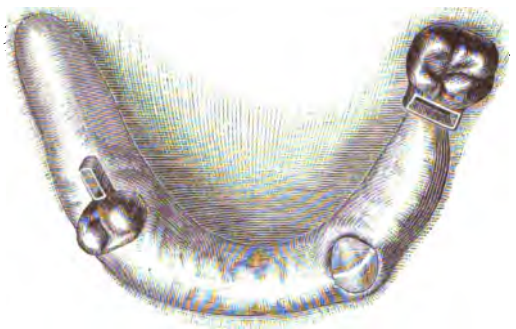
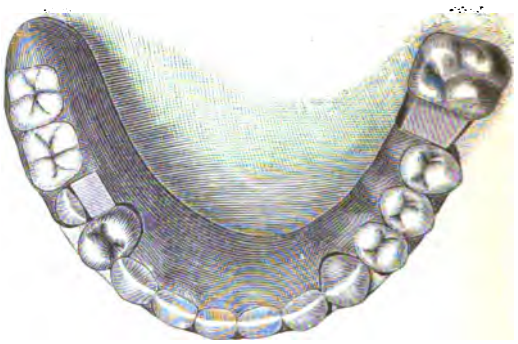


Fig. 52.



Dr. H. A. Parr, New York (June 1890, p. 439), illustrates a vulcanite

Fig. 53.

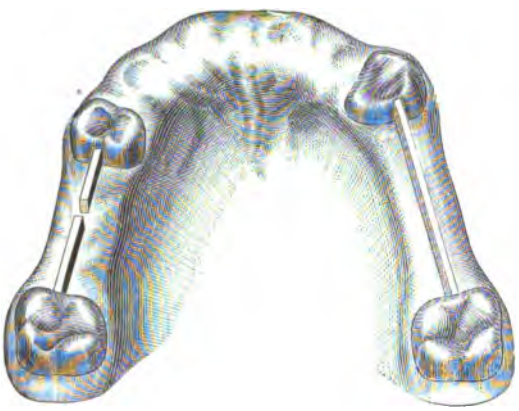
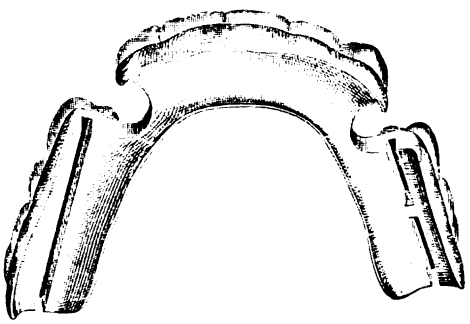


Fig. 54.



saddle-span bridge replaceable over fixed bars between cap-crowned piers. (See Figs. 53 and 54.)

Dr. C. L. Alexander, Charlotte, N. C. (January 1891, p. 26), shows cap-crown piers carrying dovetails for like sockets in the laterally replaceable three-sub bridge, Fig 55. He also shows boxed backings for facings to be fixed by bend-

Fig. 55.

ing down the pins and filling the boxes with amalgam, as shown clearly in the figure.

Dr. C. L. Alexander, Charlotte, N. C. (December 1895, p. 1003), shows in Figs.

Fig. 56.

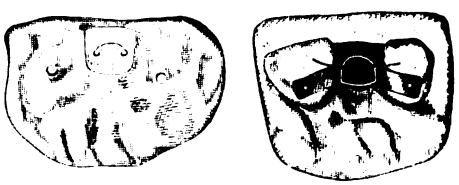


FIG. 57.

56 and 57 close-conforming subs having partial clasps hung on posts, or screws in the palatal parts of the live piers.

Dr. Emory A. Bryant, Washington, D. C. (March 1897, p. 217), illustrates in

FIG. 58.

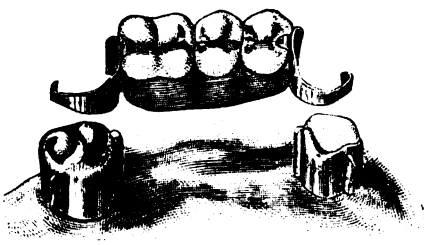
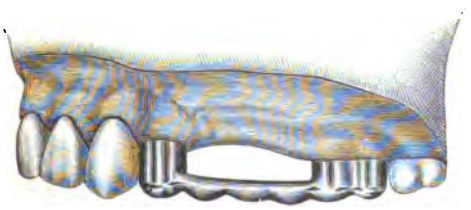


FIG. 59.

Figs. 58 and 59 his porcelain replaceable open-face crown, guide and clasp three-sub bridge.

Dr. C. W. Stainton, Buffalo (March 1899, p. 279), shows in Fig. 60 "open

FIG. 60.



position bridges," the spans of which are cusped stringers coupling the cap-crowns, which are either fixed or replaceable.

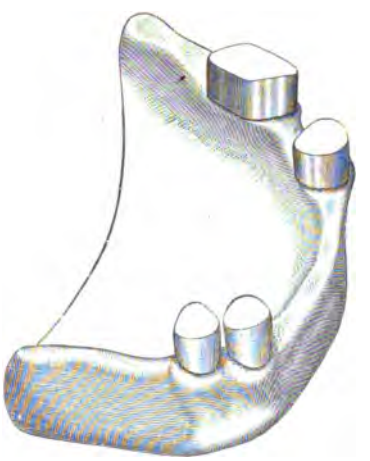
Dr. J. Leon Williams, London, Eng. (August 1900, p. 739), illustrates in Fig. 61 a Richmond bridge, the subs of which he says are "constructed with the

FIG. 61.

new slotted teeth of which I have already spoken. All who are interested in bridge work should see the merits of these teeth at a glance."

Dr. A. W. Wimmer, Chicago (May 1901, p. 576), shows in Fig. 62 cap-

FIG. 62.



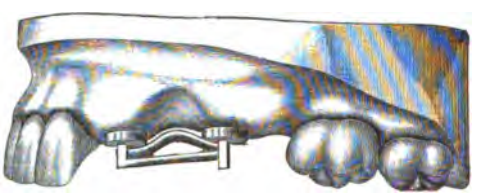
crowned piers for which telescoping cover-crowns were connected, and a

saddle crown soldered to the second bicuspid cover-crown. The six anterior subs were mounted on a vulcanite saddle to form the replaceable bridge, Fig. 63.

Fig. 63.

Dr. G. W. Schwartz, Chicago (July 1902, p. 704), shows in Fig. 64 metal

Fig. 64.



stringers between collar capped pier-posts which project to aid in the construction of porcelain sub or other structural bridge work.

Dr. Joseph Head, Philadelphia (October 1902, p. 1009), illustrates in Figs.

Fig. 65.

65 and 66 a stop, clasp, and two-sub saddle replaceable bridge; also, in Fig. 67, a one-sub stop, saddle and clasp bridge—both of the baked body and porcelain gum class.

Fig. 66.

Fig. 67.

Dr. C. Frank Bliven, Worcester, Mass. (June 1903, p. 506), shows in Figs. 68

Fig. 68.

Fig. 69.

and 69 a one-sub with stops and clasps, forming a simple replaceable bridge on live piers.

Dr. How's paper was passed, and the chairman announced as the next order of business a lantern lecture by Dr. Sinclair Tousey of New York, N. Y., on the "Uses of the X Ray in Dentistry."

Dr. Tousey demonstrated in connection with his lecture the method of using the X-ray apparatus, and exhibited many lantern slides, showing the benefits he had been able to produce in diseases of the mouth and teeth. He also demonstrated his method of making the skiagraphs of the tissues of the mouth.

There being no other business before the section, the chairman, Dr. Hinman, declared Section I adjourned *sine die.*

SECTION II:

Operative Dentistry, Nomenclature, Literature, Dental Education, and Allied Subjects.

Chairman—H. E. ROBERTS, Philadelphia, Pa.
Secretary—C. S. BUTLER, Buffalo, N. Y.

FIRST DAY—Tuesday, July 25th.

THE first meeting of Section II was called to order at 2.30 Tuesday afternoon, July 25th, in the Iroquois Hotel, Buffalo, N. Y., by the secretary, Dr. C. S. Butler, Buffalo, N. Y., in the absence of the chairman, Dr. H. E. Roberts, Philadelphia, Pa.

Dr. C. S. BUTLER, Buffalo, N. Y. Our chairman, Dr. Roberts, is absent on account of illness in his family. It is a great disappointment to him, as he has worked hard for the success of this section, and the work promises to be very profitable. I have not seen the vice-chairman of the section as yet, and do not know whether he will be here, but I have a personal letter from Dr. Roberts in which he requests me in his absence to take charge of the section, and proceed with the work as best we can. I realize my inability to carry on the work with the same facility that Dr. Roberts would, but we will endeavor to do our best.

The first paper was by Dr. J. V. CONZETT of Dubuque, Iowa, on "Gold as a Filling Material," as follows:

Gold as a Filling Material.

By J. V. CONZETT.

GOLD when properly manipulated still maintains its pre-eminence as a filling material. I say when properly manipulated, for a gold filling that is not well made and that does not hermetically seal the cavity is a poorer filling than one that is made from any of the plastics. While it is true that a

good gold filling is the most permanent one that we have, it is equally true that a poor gold filling is the most ephemeral one, when judged from the standpoint of its preservation of tooth-structure. For a gold filling that is not well made allows the fluids of the mouth to penetrate between it and the dentin, and the process of decay immediately begins. Therefore, it behooves us as dentists, if we wish to use gold, to study its peculiarities and to know how to use it. For the better we become acquainted with it the more will we appreciate its qualities and use it where permanent results are desirable.

There are many forms of gold that are used today for filling teeth, and all of the various preparations have their good qualities. We have the foils both cohesive and non-cohesive, the various cylinders made from the foils, and many crystal and mat forms. Each of these preparations has its advocates, and in the hands of experts all give excellent results. However, after having tried all of the different preparations I have discarded them, and for some years have used only the foil prepared in the manner which I shall describe later.

It will not be possible for me to outline the method of cavity preparation in the time that is allotted to me. I can only say that this phase of the work is, of course, of the greatest importance. For a filling that is made never so well cannot be a success in an improperly shaped and prepared cavity. I follow the methods of cavity preparation as taught by Drs. Black and Wedelstaedt, and having prepared the cavity as I deem proper by my study of the condition of the tooth and its environment, I am ready to introduce my gold.

Three objections have been urged against gold as a filling material: its color, high thermal conductivity, and difficulty of manipulation. These objections are all valid and yet in some positions can be entirely and in other places partly overcome. Its color is objectionable in conspicuous cavities and cannot be overcome, but in places not too conspicuous its color is not bad, for it does not darken or discolor the tooth; its thermal conductivity can be very largely modified by varnishing the cavity, and the difficulties of its manipulation can be overcome by an intelligent study of its properties, its physical characteristics and peculiarities.

Gold foil is naturally cohesive when perfectly pure, and all pure gold is cohesive. If an impurity of any description be deposited upon the surface of the foil, it loses its cohesiveness. In preparing the non-cohesive foil, a film of gas is deposited upon the surface of the foil. If this gas be one that is easily driven off by heat, as ammonia, the foil immediately regains its cohesiveness upon being annealed. If, however, the gas deposited be one that cannot be driven off by heat, as carbon dioxid, the result is a foil that is permanently non-cohesive and that cannot be made cohesive by annealing. Inasmuch, therefore, as there are impurities in the air about us, and especially in our operating-rooms and around our cabinets, it is well to protect the surface of our foil from possible contamination by agents that cannot be easily removed. Dr. Black advises doing this by keeping in the gold box an open dish of ammonia, the gas of which will be deposited upon the gold, protecting its surface from contamination by any other agent; and then, immediately before using, anneal the foil, driving off the film of ammonia, when a

perfectly pure and cohesive surface will be secured.

Nearly all of the non-cohesive, or so-called "soft" foil comes with an ammonia-protected surface, so that if those foils are used it is only necessary to carefully protect the gold, and not allow it to become too old before using.

We prepare the foil that we expect to use as cohesive gold, in pellets of $\frac{1}{8}$, $\frac{1}{16}$, $\frac{1}{32}$, and $\frac{1}{64}$ of a sheet. In doing this we take a sheet of foil and divide it into the proper number of squares, then folding the corners in toward the center, fold the square into a pellet. We do this that we may know definitely just exactly the amount of gold that we are using when we pick up a pellet of gold. We believe that definite methods produce definite results, and, as the force and number of blows of the mallet that are necessary to condense a given piece of gold has been worked out in the laboratory, we know when we place a $\frac{1}{32}$ of a sheet pellet, for instance, upon a filling, the number of blows of the mallet required to condense that piece.

The filling is started with a $\frac{1}{64}$ pellet tucked into the linguo-gingival-axial angle, as a rule, and malleted carefully to place, always malleting from the center toward the walls of the cavity. We use the hand mallet because we believe that it gives us the best results. Dr. Black, in the *Dental Cosmos* for September 1895, gives us a series of tests that he made with different mallets. Fillings were made by many operators with mallets of various kinds, and the result was vastly in favor of the hand mallet when used with considerable force. Next came the automatic mallet, and last and very far in the rear came the electric engine, and mallets of the woodpecker species in general. I know that certain operators claim that they can make dense fillings with these mallets, and I have no desire to dispute any assertion that they may make on that score. I only wish to say and to say it with emphasis, that I cannot—and I know, for I have tried it. I used the electric mallet for two years and I do not need to go to my records to tell me when and how one of those fillings was made, when a patient presents one for inspection. It bears the pits upon its face. The fillings that I made with the electric mallet have caused me more grief and humiliation than all of my other operations put together. So we use the hand mallet in the hands of a trained assistant. We do it because we can make better operations and make them much quicker.

The filling is built up piece by piece, always malleting from the center of the cavity toward the walls, thereby causing the gold to be driven or "flowed" toward the walls, making a moisture-proof joint. Never under any circumstance should the point of the plugger travel away from the walls of the cavity. The last blow upon a given pellet should be the one that sends it snugly against the wall. We know that malleting or pounding gold tempers it and makes it hard and springy. Therefore if we mallet the piece against the wall first and then toward the center, we will have made the piece hard and it will draw away from the wall of the cavity as our plugger point travels toward the center, and all of our malleting afterward in order to drive it to place will be in vain, and we will have an imperfect place in our filling.

Then, again, the plugger point should be used in a definite and intelligent manner, not here and there haphazard. Beginning in the center of the cavity the

plugger should be stepped in an orderly sequence of steps from the center toward the walls of the cavity until the whole pellet shall have been thoroughly condensed. We insist upon holding the plugger point firmly upon the gold, using considerable hand pressure in addition to the mallet force, for if the plugger is held away from the filling the greater part of the force of the blow of the mallet is dissipated in driving the plugger point down to the gold, and the gold is not properly condensed. A perfect gold filling should very closely approximate cast gold in density. It should have a density of from 19 to 19.2 specific gravity. In order to most closely approximate such density it has been demonstrated by laboratory experiments that it requires twenty blows of the mallet for a $\frac{1}{64}$ of a sheet of foil, forty blows for a $\frac{1}{32}$, eighty for a $\frac{1}{16}$, etc. The force of the blow must, of course, be regulated by the size of the plugger point, as the force of the blow to produce the same result must increase according to the square of the diameter of the plugger point. It is obvious, too, that a small plugger point is therefore advisable. We never attempt to adapt our gold to a polished enamel margin, for we know that it is almost if not quite impossible to adapt cohesive gold to a polished surface. Perhaps every man in the Black and Wedelstaedt clubs has tried the experiment, and not one has been able to do it; perhaps others can—that remains to be demonstrated. But we do know that we can adapt the gold to a planed surface, therefore we do not polish our cavity margins with sandpaper disks, etc., but plane them carefully with sharp chisels and hoe-shaped excavators.

The operators of the old days knew nothing about cohesive gold, and yet they made some very beautiful and lasting fillings. With the advent of cohesive foil, however, the profession, in its delight with the new, forgot the good qualities of the old, and the use of non-cohesive foil passed into desuetude. We are beginning to appreciate the fact that that was a mistake, and at the present time we are combining the two, using the good qualities of both, and eliminating as much as possible their bad qualities. In cavities in the approximo-occlusal surfaces of bicuspids and molars this method is ideal, and saves time, energy, and nerves.

The non-cohesive or unannealed foil is prepared by cutting a sheet into halves and quarters. These are then folded into ribbons of varying widths, and these are in turn rolled into cylinders upon a Swiss broach, a hatpin, or other suitable instrument. In using them for instance, in a cavity in the mesio-occlusal surface of a molar, a quarter cylinder is placed in the linguo-gingival angle, and one in the bucco-gingival angle, and these are keyed to position by placing one or more half-sheet cylinders between them on the gingival seat and then strongly condensing them with hand pressure, which may be followed by mallet force if desired. After this we commence with our cohesive foil, anchoring it in the step in the occlusal surface and building the gold forward and over the unannealed foil in the gingival third of the cavity, effectually locking it into place. By using this method we not only gain a better adaptation at the most difficult point of our cavity, the gingival seat, but we reduce the time of the operation very materially. Another place in which we use the non-cohesive cylinders is in cavities in the occlusal surfaces of molars. The cylinders are placed on end against the pulpal wall of the cavity and wedged

to place until there is but a small space left in the center of the cavity that is not filled. In this we now place small pellets of cohesive foil until the cavity is entirely filled, and then condense the whole filling thoroughly.

I have of necessity hurried over the points in this paper. I was warned not to exceed two thousand words, and I fear that I have already done that. But those that are interested in the methods that have been taught by Dr. Black and Dr. Wedelstaedt can receive more than I can possibly give in a paper, by watching the operations that will be made by the men of the Black and Wedelstaedt clubs at the clinics.

As for me, I wish to say that I struggled with old methods and new methods. I tried all forms of gold and all forms of mallets, only to sink deeper and deeper into the slough of despond. But since adopting the methods which we men of the Northwest are so enthusiastically advocating, my operations in gold are my pride and my delight, and the failures are few and far between, and cases that do fail are those that have not been carried out in accordance with the system with sufficient accuracy.

Discussion.

Dr. H. I. Beemer, Newton, N. J. I spent several weeks in the middle West about a year ago, and while there it was my privilege and pleasure to visit a number of members of the G. V. Black Dental Club and observe them make these operations. During my fifteen years in dentistry I have seen fillings of gold from the hands of many of our best Eastern dentists, but never have I seen such beautiful and apparently lasting operations as those which I saw done by the members of that club. Since that time I have tried to operate along those lines, and the more I try to work in that way the more it appeals to me as being the only way in which gold fillings can be made really permanent.

Dr. Butler. I want to introduce to you a very old friend of mine, Dr. W. H. Williamson of Aberdeen, Scotland, ex-president of the British Dental Association, who was my demonstrator in college more than thirty years ago. From that time to the present I have not had the privilege of seeing him, so it gives me unusual pleasure to welcome him here today, and ask him to say something in the discussion of this paper.

Dr. W. H. Williamson, Aberdeen, Scotland. I beg to thank Dr. Butler for his very kind welcome, and also to thank all of you for your very cordial greeting. I had hoped to come last year to St. Louis, as official representative of the British Dental Association, but circumstances prevented me, so I have seized the next opportunity of revisiting this country after an interval of thirty years.

Upon the occasion of my first visit I was very much impressed by the devotion to noble professional ideals that so many men of that time possessed; such, for example, as Dr. Atkinson and Dr. Marshall Webb, who both spent time and money in doing their best for their patients and for their profession. They were imbued with a great missionary spirit, and were never weary in trying to induce others to follow the same path onward and upward in the progress of dentistry. I find now that though individuals have fallen, the race survives, and that there is still the same striving after noble ideals—the spirit that has done so much in this country to promote the advancement of our profession.

In regard to the paper just read, I am not in a position to say much, as I was unable to hear a great part of it, but I was certainly surprised to hear, at this time of day, that one could not make a gold filling with the electric mallet in which pits would not appear afterward. When I remember Dr. Webb, who built up the greatest reputation in the states as a gold filler, and who used the electric mallet entirely, I cannot understand such a statement; he certainly would never have been regarded as the premier gold filler of his time if the proof lay in the display of a lot of pitted fillings.

Advances in the science of making and manipulating plastics, together with the advent of matrix-fused porcelain, have very seriously undermined the supremacy of gold as a filling material. At any rate that is the case in Britain and it is evident that the same influences are at work here also.

Dr. E. T. Darby, Philadelphia, Pa. I did not hear the whole of Dr. Conzett's paper, but I heard enough to convince me that he, like all those who are members of the G. V. Black Dental Club, is enthusiastic upon the methods which they have accepted, and which they so well carry out in their own locality. I was wonderfully impressed last summer at the Fourth International Dental Congress at St. Louis with the work that was being done by that little coterie of men who represented the G. V. Black Dental Club. Those of you who witnessed their operations and the earnestness which attended their work must have been assured, as I was, of the great enthusiasm which had been instilled into them through some source—I will not say by whom—and which has resulted in a corps of men whose operations cannot be excelled in this or any other country. I never saw a finer series of operations than those they exhibited at that time. It is undoubtedly true that Drs. Atkinson and Webb enthused the American dentist of thirty years ago with the importance of thoroughness in preparation, and the packing and finishing of gold. We owe a great deal to Drs. Atkinson, Varney, and Webb for the fine operations that are being performed by the American dentists at the present time. Dr. Varney was probably the most artistic in his operations of any man who had lived up to that time. It is undoubtedly true that many of Dr. Varney's operations were as fine as any we see today. I knew Dr. Webb when he began the practice of dentistry; I knew the influences by which he was surrounded, and that he had the spirit of Atkinson and Varney so thoroughly instilled into his little body and brain that he could neither sleep nor rest until he had carried out his ideals in the matter of gold fillings. The operations he made twenty-five and thirty years ago are often seen today—as beautiful as could be made, I think, by anyone at that time, and possibly by anyone at this time.

In regard to the pitting of gold which has been packed by the electric mallet, I would confirm what Dr. Williamson has said. Gold can be as thoroughly packed, and when finished will be as free from pits by the use of the electric mallet, or a good mechanical mallet, as by any other means. It is undoubtedly true that many of the electric mallets in use have been improperly adjusted, and many of the mechanical mallets have not a sufficiently hard blow to thoroughly condense the gold. All things considered, perhaps the man who has not a good electric or mechanical mallet would do better to use a hand mallet and a small point with fine serrations. The matter of condensing

gold is merely a matter of thoroughness, plus shallow points.

Many of us know that just as lasting operations have been made with non-cohesive gold in simple cavities as have been made with cohesive gold. At the same time I think it would be a mistake for a man to confine himself to either. The procedure in the process Dr. Conzett has given us is undoubtedly one of the most efficient that has ever been used, namely, a combination of cohesive and non-cohesive gold. Many do not understand what is meant by non-cohesive or soft gold. I take it that Dr. Conzett does not mean gold that is absolutely non-cohesive, as I believe that there are but two manufacturers in this country who have ever made absolutely non-cohesive gold—Abbey and Morgan & Hastings.

It is not that kind of gold that the men of the Northwest use; they use a gold that possesses only a moderate degree of cohesion. In other words, it is gold that is slightly cohesive under pressure and yet sufficiently non-cohesive to admit of perfect adaptation to the walls of the cavity. They use it in the form of ropes, tape, or cylinders, and make a better adaptation with it than with cohesive foil used in the same way. To expedite the operation they use non-cohesive gold at the cervix. I do say that a man can use cohesive gold successfully, if he take the time and use it bit by bit; but he can use non-cohesive gold at the cervix, and the result will be as durable. I know of no other method by which I can save time and get more satisfactory results.

Dr. W. R. Clack, Clear Lake, Iowa. I am proud to be designated as one of those "fanatics of the Northwest," but I think if you will come and spend a little time with us, you will find that we of the West and you of the East are not so far apart. There is a difference in our terms, and a little difference in our methods, but we are both striving for the same thing—the best there is in dentistry. We are both trying to carry out what we believe to be the ideals of those old masters—those men of whom we can scarcely speak without our emotions carrying us away. I believe today that the principles taught us by Dr. Black and by his able lieutenants are some of the principles of Dr. Webb, carried on to perfection. I do not understand today that any of the principles taught by Dr. Webb are being opposed by these men, but it has been the privilege of Dr. Black to systematize and further perfect those principles.

Referring to that portion of Dr. Conzett's paper in which he speaks of the three objections to gold, I will only speak of the last—the difficulty of manipulation. I do not think that that should be regarded as an objection. I believe it is our duty to overcome those difficulties—to so train the hand of the operator and the hand of the assistant, that we may make those operations perfectly and know nothing of that difficulty.

It seems to me that a mistaken idea obtains with regard to the methods of cavity preparation advocated by Dr. Black. I will not speak on that point, as it is a separate subject; but the objection has been made that in preparing cavities for these operations we inflict more pain on the patient than in preparing the same cavities for the reception of plastic filling materials. But such is not the case, for the same principles that apply to cavity preparation for gold apply to cavity preparation for amalgam.

Speaking of the condensation of gold, and the different methods of condensing

it, I do not know of any method by which the weight of the blow can be as quickly and delicately regulated as with the hand mallet. Just the movement of an eyebrow, and the blow is changed.

I saw a few months ago a statement made by some gentleman in Canada opposing the use of the mallet in gold operations or for driving the band on a tooth, on the ground that it was cruel practice. Firm hand pressure must be used if you would lessen the pain. There is in St. Paul an assistant who can strike a harder blow with the mallet than anyone I know of. I have sat in Dr. Wedelstaedt's chair for hours having a filling made at a clinic, and when he is using fifteen pounds hand pressure and the assistant is giving such a blow as she gives when he nods his head in that impatient way, the pain is very much less than if he were using an automatic plugger and no hand pressure.

In using the unannealed gold in starting the filling in the gingival third of bicuspids and molars, I think we all use the method indicated by Dr. Conzett of placing three or more cylinders of unannealed gold at the cervical margin before beginning with the annealed gold at the step. Here let me say that we use the terms "annealed" and "unannealed" gold among ourselves. It is from the same foil that the two forms of gold are made, namely, the cylinders that are placed in the gingival third, and the pellets with which the filling is finished. If we could get together a little, and understand just what we mean by the terms we use, we would have no differences. Start in the step with the annealed gold, and after anchoring it in place build out toward the axial wall, carrying it over until it becomes united with the unannealed gold in the gingival third; then go back and forth, laminating the gold, and each successive time carrying the annealed gold a little farther toward the interproximal space, because if one begins and thoroughly condenses the unannealed gold at the cavo-surface angle, one is liable to tip the gold out of the cavity. If, on the other hand, the first piece is brought over from the step into the gingivo-axial angle, either lingually or buccally, as seems best, then by condensing back and bringing over another layer it will be found that the unannealed gold is gradually condensed as the angle is being filled up, and that the annealed gold is clutching the unannealed gold and holding it in place.

I am surprised at what Dr. Williamson says of the operations in England. I have a little English blood about me myself, and I have always been taught that the Englishman when he builds does not build temporarily. My idea of England, and the desire to visit it has been that I might see those buildings that were erected by the hand of man centuries ago. They were not built with the expectation that they would tumble down within a few years and have to be rebuilt. They builded them for all time, and I am surprised that they have let down on that idea when they come to make dental operations. It is at variance with my idea of the sturdiness of the English and the steadfastness of the Scotch.

Dr. John I. Hart, New York, N.Y. I do not think there is such a vast difference in the theories of the Western practitioners and those of the East, although until ten or twelve years ago a difference certainly existed. About ten years ago, when Dr. Wedelstaedt visited one of the dental societies in the East, the ideas that he expressed were not well received. When Dr. Black and Dr. We-

delstaedt visited the same society at its December meeting last year they expressed views similar to those Dr. Wedelstaedt had presented some years before, and there was no great difference between the theories of those who discussed the papers and those enunciated by Dr. Black and Dr. Wedelstaedt. It merely means that the filling of teeth with gold has become a mathematical principle. The preparation of cavities and the introduction of foil has become a settled fact. We may differ in the degree of our extension on small cavities, but when it comes to the preparation of larger cavities, I do not believe there is an iota of difference between the methods practiced by the best practitioners of the West and those of the East.

As to some of the views expressed by the essayist, there is no royal road to learning or to the practice of dentistry, and we must all work hard to attain success. I think many of the failures that have been encountered with plastic gold are due to the fact that too much has been promised as to the ease with which it might be condensed. If you will work as hard with plastic gold as with foil, you will probably achieve as good results; but then the excuse for its use is eliminated, and we employ moderately heavy foil when we desire the greatest density. One thing is lost sight of when heavy blows are given. We have around the root of the tooth a pericementum, which we must preserve. With the use of mallets that deliver heavy blows we are liable to injure that membrane, and we are better off by making use of the lighter foils and small cylinders with moderate pressure than with too heavy cylinders and too great pressure. I would like to ask the essayist as to his views concerning the use of absolutely non-cohesive cylinders at the cervical border. I think we will make tighter joints by making use of absolutely non-cohesive gold at that point than by the use of semi-cohesive gold. I think the saving of teeth by the use of tin at that point is due more to the tight joint we can make than to any therapeutic value of the tin itself.

Dr. G. D. SITHERWOOD, Bloomington, Ill. I have been greatly interested in this paper, which I consider a very valuable one. I have had considerable experience in working gold. At one time I was an enthusiast in working the different forms of crystal or crystalloid gold. I do not work crystal gold at the present time; not but what a good filling can be made with it, but it requires a longer time than to make a good filling with gold foil or some of the forms of gold cylinders. I use only gold cylinders and the various forms of gold foil known as soft and cohesive gold foils. The essayist spoke of the color of gold, which we all know is frequently objectionable. I overcome that by using in the finishing of many fillings what is known as the platinized gold, shade No. 3. The surface of a filling thus finished is whiter and comes nearer to the color of the tooth.

The thermal changes I overcome by using phosphate cement—a very small quantity. It requires considerable practice and skill to use it properly. It can be used to advantage, in small quantities, to start the filling in the floor of the cavity. At one time I attempted this method and failed; but now I am successful.

As to the difficulty of manipulation, I believe I have used all forms of mallets —automatic, electric, mechanical, and the hand mallet. A good gold filling can be made by a good operator with any kind of mallet, if he understand the working

of gold; but in these days time is a great consideration and consequently I believe with the essayist that frequently a good gold filling can be made in less time with the hand mallet. However, I use an automatic and hand mallet at the present time.

Much has been said about the weight of the mallet, hand pressure, and all that. Every good operator in the working of gold learns this one thing—that it requires so much pressure, whether given by the hand mallet, the automatic mallet, the electric, or whatever force one may use. It requires just so much force to condense gold. Force in excess of the maximum will result in pain to the patient and over-taxation to the operator, while an insufficient degree of force will not condense the gold. That is the one thing we must learn—how much force it takes to condense gold properly.

Another thing I have found by experience. I have some good gold fillings that look as well today as when they were first inserted twenty years ago. I used the same kind of gold I am using today, known as soft gold, which becomes cohesive upon annealing, always finishing with the gold foil folded flat. Take a half sheet of No. 4, fold it about eight times, cut it into squares, condense the gold on the surface of the filling by means of a fine serrated point mounted upon any kind of mallet, and the result will be a filling properly finished, composed of gold better condensed than by any other method I have ever tried.

Dr. F. L. Fossume, New York, N. Y. At a clinic before the First District Dental Society Dr. Searl filled two approximo-occlusal cavities in the upper bicuspids. When the cavities were prepared and ready for the insertion of the gold, it was announced that they might be examined by those who wished to do so. It was openly stated by some of those present that the pulps would very likely give trouble, and ultimately die. As these filling operations were made for an assistant in my office, they can be inspected at any time and easily kept track of. I know that the teeth were sensitive for some time after they had been filled, but they are now entirely normal, as I made it a point to inquire into their condition before leaving New York for this meeting. As the time required for large gold fillings has been commented on, I would say that Dr. Searl was timed during these operations, and occupied twenty-three minutes for one and twenty-six for the other; this was the time required in the packing of the gold only.

A Member. How large were the cavities?

Dr. Fossume. These cavities were prepared accurately after Dr. Black's method of extension for prevention, with anchorage in the fissures. They were large cavities. As Dr. Searl did not have the time I had the privilege of finishing one of the fillings, and found it hard and well condensed, for I burnished it using great pressure. It is a good test when a filling does not dent under the pressure of a burnisher.

The method of using an adhesive cement as a medium to anchor metal fillings, where the walls are thin and the teeth weak, was taught me in 1893 by the late Dr. J. Foster Flagg. He asked me if I knew how to anchor gold and amalgam fillings without undercuts, and when I answered in the negative, he at some length explained this method, and my experience thus far has been that it is an indispensable one.

Dr. William H. Trueman, Philadelphia, Pa. I hold very firmly that there

is no one method of using gold that we are justified in saying is the best; there is no one best form of gold; there is no one best form of instrument, and no one best method of bringing the instrument and the gold together. It is all a matter of personal equation. Some like crystal gold, some like non-cohesive, some semi-cohesive, some like their gold just as cohesive and sticky as it can be made. Some like instruments with deep serrations, some like them with shallow serrations, some prefer them perfectly smooth. Some use the instruments with a pushing motion, some with a rubbing motion, and some with a circular revolving motion. With all these varied kinds of gold and instruments, and by all these varied methods of using them, good work can be done—it has been done, and can be done now.

At the present time the method most in vogue is to divide the gold in small portions and carefully weld it together, piece by piece. My preceptor was in the habit of thoroughly inspecting the cavity before taking out from his gold-foil book as much as he thought would be required to entirely fill the cavity. He would take as much as three or four sheets for a large cavity, fold and roll them into a firmly rolled cylinder, and place it in the cavity; then take a portion of a sheet of foil, make it into a firmly twisted rope, cut it into pieces one-quarter of an inch long, and pack a few of these little bits around the cylinder, finishing it with a file-cut burnisher, and in almost as little time as it takes me to tell it, the filling would be done. Sometimes he used several of such-like, but smaller, cylinders. Some will ask what kind of fillings he made. I do not pretend to answer this, but I have seen hundreds of fillings which he made that had lasted ten, fifteen, twenty, or thirty years, and had perfectly filled their purpose. What more do we want than that? It cannot be done in all cases, neither can all men do it, but it can be done, because it has been done.

Each method has its advantages and disadvantages, and it is important that we should learn them. Each method has its little tricks ready to play on the unwary. That was called to my attention when the essayist spoke of his unsuccessful results with the electric mallet. I know no more perfect instrument for compacting cohesive gold than the electric mallet, and I know of no instrument so full of tricks as is that same electric mallet. It will go humming along right merrily, and you think how beautifully it is working, yet if you stop and test with an excavator, the excavator will go right through. Then it has another beautiful trick. You start your filling and everything is working nicely; you work for an hour or two and get it full and nicely contoured, and happy are you if it should roll out before you dismiss your patient, because you can, without being able to perceive where the trouble is, make a beautiful solid filling just a trifle smaller than the cavity. I caught on to that trick very clearly in my experience with the electric mallet. To avoid it, I tack on to the filling a strip of foil projecting beyond the cavity, and closely watch it until I know that the filling is securely anchored. If this strip remains steady, I know that all is well; if it wabbles I know that it is time to stop, take all the gold out, and begin again. Notwithstanding, the electric mallet is, in my judgment, the king of gold packers if one knows how to manage it. Each method has its advantages and disadvantages; that method is best for each operator that

he finds best, without reference to what others have done.

Dr. BUTLER. Inasmuch as Dr. Searl's name has been mentioned, we would like to hear from him.

Dr. A. C. SEARL, Owatonna, Minn. The amount of gold in those fillings I am unable to tell. My assistant kept track of it, and I cannot tell you exactly. I should presume at a guess there are about four sheets of No. 4 Williams' foil in each filling.

Dr. H. B. TILESTON, Louisville, Ky. As to the use of non-cohesive gold—we have gold that is called non-cohesive that is not so. I do not know of any gold on the market that is non-cohesive and which cannot be made cohesive by annealing, except that old gold that has been on the market over eighty years, known as Abbey's foil. Any gold which can be rendered cohesive by annealing has been rendered non-cohesive by the deposit on its surface of some volatile gas, which can be driven off by heat or may often be unintentionally rubbed off by friction. I believe it is now quite generally accepted that one of the best methods of getting adaptation to the margins is by the use of these non-cohesive cylinders, and it also saves time. I did not hear the paper, but I presume that the essayist advocated the use of three or more cylinders at the gingival margin—one on each side and one or more between. The friction of the gold, one piece upon another and upon the cavity walls, and the bruising of it with instruments, is likely to give it a cohesive surface. The operator is liable, as the key cylinder is being inserted, to have it stick at some point on the way to the wall toward which it is being carried, and to think that a close joint has been secured, when as a matter of fact it has not. With Abbey's foil, which does not become cohesive by friction, one can get it past the other gold and be certain of perfect adaptation to the cavity walls.

Dr. Clack speaks of the advantage to the peridental membrane of the mallet blow combined with hand pressure. He speaks truly when he says you cannot do that with an automatic mallet; but you can do it with the old style pneumatic mallets, with which perhaps some of you may be familiar. I think they were made after a method in vogue perhaps before I was born, with a cylinder and a plunger actuated by air pressure conveyed through a rubber tube from a bulb worked by the foot. You can combine hand pressure and vary the force of the blow just as you may desire.

Dr. C. H. GERRISH, Exeter, N. H. I am an Eastern man—from New Hampshire—but I have been using Abbey's foil for over forty years, and what I do not know about it is not worth knowing. That is no joke. The secret is in the man. I am more of a shooter than I am a dentist. Take two men and give each a gun with shells, and each the same kind of game, and what have you? Just what you have presented to you here. You have your patient, you have the tooth, you have the material. One man kills all the game, and the other man does not touch a feather. Follow it up all day, or the whole season. The skill of the man is a prominent factor in dental operations. I wish to speak of my experience with non-cohesive gold without the addition of cohesive foil. I shall give a clinic tomorrow, and if anyone wants to see a non-cohesive filling, I will show a countryman's way of doing things. I claim that Abbey's non-cohesive gold will save a poor tooth longer than any gold filling material that is used, and I do not care who the man is who inserts it. You

have a filling, that is a foil filling, when it is finished, it is a cork stopper in a glass-necked bottle; but with cohesive gold, when you are through with it, you have a glass filling in a glass bottle, or rather a gold ingot that can be rolled into plate.

Dr. D. J. McMillen, Kansas City, Mo. I am from the West, and what I do not know about non-cohesive gold would make a book. I have been using soft or non-cohesive gold for thirty years, and I regard it as one of the very best golds that can be used for the saving of teeth. I have used Abbey's gold a great deal. There is another that is absolutely non-cohesive, and that is the kind put up by Morgan, Hastings & Co. A non-cohesive gold cannot be made cohesive by annealing; no difference how it be treated, so far as the dentist knows it cannot be made cohesive. If it can be, it is not fit to be used as non-cohesive gold.

In regard to using three cylinders for the purpose of filling the cervical wall of the tooth: a single cylinder rolled into a full sheet is fully as good; it adapts itself so perfectly to the walls of the tooth that it will save it for as long as I have practiced. I have seen many that have saved teeth for twenty-five years.

I could not refrain from saying a few words on the subject. I use both the mallet and hand pressure for the starting of non-cohesive gold. I fill many teeth with non-cohesive gold entirely. That is my practice. Of course an approximal cavity is not the proper place to use it, except in combination with cohesive gold. The end of a cylinder must come to the surface of a tooth, otherwise it scales in that position.

Dr. Conzett (closing the discussion). I have taken enough notes from the thoughts which the various men have expressed to lecture on all the afternoon; but I am not going to do so. I shall say little, because as the different men have arisen they have largely answered the questions and also the objections of those who preceded them. The personal equation does enter into the filling of a tooth. All men will not be able to fill the same tooth equally as well by using the same method. One man will make a good filling with the automatic mallet; another with the hand mallet. So we have different methods in the hands of different men giving good results. But notwithstanding that, should we not have better results if we systematized our methods of operation, and all used the same methods? Would it not be well to teach the pupils in the colleges the same methods? Would we not secure better results than by all using different ones?

Some men may make good fillings with the electric mallet. Dr. Webb was unquestionably one of the best dentists that ever lived. I said I could not do it, and I was glad Dr. Trueman told me why.

Many men have attempted to make operations by following different methods. Those fillings have been tried for density and for specific gravity, and no man that has tried to make a filling with the electric mallet and had it tested by the Black Club has been able to make one above fourteen in specific gravity. There may be men here who can do it, and those who have charge of the matter would be glad to have the man who can make a filling above the density of fourteen or sixteen try it. They will send him a block and let him attempt it, and if he succeeds, they will acknowledge the fact; but thus far no one has been able to do it. They have been able to do it with the hand mallet.

Dr. Williamson spoke of the long sit-

ting necessary for the gold operation. Other men speak of the same thing. The men who make these operations do not have their patients sit a long time. My assistant does not make an engagement for a patient for over an hour. I do not take over an hour for an operation in gold, and the rest of the members of the Wedelstaedt and Black clubs do not take any more, or much more, than that.

Dr. Hart asked me if I did not think it necessary to use absolutely non-cohesive gold. I think it is necessary to use non-cohesive gold. When we say absolutely non-cohesive gold, we mean the kind that cannot be made cohesive by annealing. I think the gold is non-cohesive as long as the film of gas remains on it, and I do not think that that film can be removed from it without annealing. I have made one or two fillings which have failed; have had several pulps die under such fillings, and have found it necessary to remove some. I am not infallible; I know that those cylinders that are placed under the cohesive gold foil are still non-cohesive. I have taken them from under a filling, and have been able to take them apart. Dr. Clack tells me that he took out a filling in which he first used the non-cohesive cylinders, and afterward the cohesive, in which the entire filling came out intact. I believe that is the exception—not the rule. I believe it necessary to have the gold at that point non-cohesive in order to adapt it to place. The layers of gold must freely pass one over the other, or there will not be perfect adaptation to the walls of the cavity.

Dr. Hart also spoke of the peridental membrane being injured. I do not think it will be by the force of the blow. I know none of my patients have ever complained of soreness after an operation. I believe that is due to the fact that the tooth is held firmly in one position. It is not allowed to wabble back and forth at every blow of the mallet. The force of the blow is felt on one part of the peridental membrane.

I do not like the idea of cement in the floor of a cavity, with the view of starting the filling with a pellet of gold malleted in the cement bed. That cement does not obtain its maximum density for from forty-eight to sixty hours, and when the gold is malleted on it immediately upon insertion it will not harden, but will remain there in a semi-powdered form. I should not do it, or recommend it.

The subject was then passed.

The next order of business was the reading of a paper by Dr. DANA W. FELLOWS, Portland, Maine, entitled "A Few Dental Writers of the Eighteenth Century." Dr. Fellows not being present, Dr. L. S. Chilcott, Bangor, Maine, read the paper, which was as follows:

A Few Dental Writers of the Eighteenth Century.

By D. W. FELLOWS.

THE profession of dentistry was born in the city of Paris at the beginning of the eighteenth century. In 1700 provision was made for the examination of those who wished to practice surgery of the mouth, but of the struggles of the young profession during the next quarter-century we know but little, though

history has handed down the names of several who practiced dentistry during that period and who won recognition as intelligent and educated men. In 1728 a foster-father arose in the person of Pierre Fauchard, whose work on dentistry was published in the year just named. This was a systematic treatise in two volumes of over eight hundred pages.

We may probably accept as correct this author's statements as to the conditions prevailing at the time of his writing. He says, "While surgery in general has recently been much perfected and many important discoveries have been made in anatomy and in modes of operating, and many learned and curious observations published, dentists, however, do not find among them anything at all sufficient to guide them in their operations." The reason for this is, he says, "that the part of surgery which pertains to diseases of the mouth has, to the present time, been very much neglected."

"Writers on anatomy and surgery," he continues, "either have not spoken at all of diseases of the mouth, or have treated them very superficially, in order that they might not seem to omit anything necessary to the completeness of their system." "The most celebrated surgeons," he says, "having abandoned this part of the art, or, at least, having cultivated it but little, their negligence has caused a class without either theoretical knowledge or experience to embrace it and to practice it empirically."

That caries and other diseases of the teeth were as prevalent then as now, may be inferred from his statement that "Those who preserve all their teeth in a healthy condition to advanced age are very few." This author tells us that it was his purpose from his youth to practice surgery, and while engaged at times in other occupations he never lost sight of this, and finally became the pupil of Alexandre Poteleret, surgeon major in the royal army.

Fauchard's treatise on the teeth was the first published in any language worthy of such a title, and as such it shows that considering the time in which he wrote, he had a broad and deep knowledge of the subject, great familiarity with details, and keen judgment. A very brief abstract will illustrate, in some degree, the nature of his work. He designates, as he says, more than one hundred really distinct diseases of the teeth. He speaks of teeth as bones, saying that they are the whitest, hardest, and most solid bones of the body. This error in designating the teeth as bones was not corrected until nearly a hundred years later. He gives a good description of the twenty deciduous teeth, and says that they are not without roots as some authors pretend, and that under these twenty teeth are to be found the germs of the permanent teeth, which appear when the first are lost.

Erosion is described as we know it today, and the name given to the affection. "The nervous membrane which covers or lines the cavity" of the tooth, that is the "lining membrane," is often referred to, and this term was constantly used for more than one hundred and twenty-five years.

Fauchard did not believe in the existence of worms. "Some authors," he says, "as well as the common people, have believed and still believe that caries and all pains of the teeth are caused by dental worms, which little by little gnaw the tissue of the bony fibers and the nerve filaments." "The existence of these worms has been reported by illustrious authors, but having never seen them, I can neither

deny or admit the fact," "but," he concludes, "while admitting that such a thing is not a physical impossibility, I do not believe that caries of the teeth is thus produced and certainly not in all cases."

The "worm theory" of toothache has prevailed in Eastern countries for a thousand years.

When Fauchard was compelled to disagree with celebrated authors he did so with becoming modesty, often appearing to be distrustful of his own judgment, as in his condemnation of the practice of cauterizing the ears for the cure of toothache—a practice recommended and minutely described by Valsalva, professor of anatomy at Bologne.

Another noted surgeon advises placing sulfuric acid in the cavity of the tooth. Fauchard says, "Without wishing to attack the merits of so able a surgeon, I venture to say that this practice is very dangerous." He then enumerates the evil effects that may follow, and proposes for the cure of toothache three remedies: (1) Oil of cinnamon and oil of cloves, either mixed or separate. (2) The actual cautery. (3) Filling.

He is convinced that tartar is deposited from the saliva, and that it originates from the calcareous matter held in solution in that fluid. He condemns what he says is a common practice—seating persons on the floor for the extraction of the teeth, and advises that every care be taken to preserve all teeth that are specially desirable for use or ornament. When necessary he does not hesitate to extract teeth for pregnant women—not believing, as many do, that it is likely to cause serious symptoms.

Our author's description of the gums is very clear and concise. Many of his remedies for difficult dentition seem somewhat whimsical, but his directions for lancing the gums when the symptoms seem to require it, were repeated by an eminent dentist one hundred and fifty years later.

For the use of the potential cautery in cases indicating it, he gives the most minute and explicit directions for the avoidance of injury or accident.

Many of the mouth-washes and tinctures recommended seem at first glance strange and almost fantastic, but on analysis they are found to be usually in accordance with the knowledge and resources of the time, and at least are not bad.

He urges the necessity of carefully washing and drying all instruments after use, as well for cleanliness as to prevent rusting, and recommends separation of the teeth by filing for the arrest and prevention of caries, the form of these separations being the same as that advised by an eminent American dentist but little more than thirty years ago.

Fauchard practiced replantation and transplantation of teeth, and commends the practice in suitable cases, saying it is quite generally successful.

In filing teeth for shortening, the angles should be rounded and the natural shape of the tooth preserved. "In this," he says, "as in all other things, we should imitate nature as much as possible."

Thus I have endeavored to give a very brief abstract of this first systematic treatise on dentistry, in order to indicate in some degree the scope and character of Fauchard's work. This author's writings are simple and unaffected in style. His vocabulary is small, but his descriptions are accurate, and his directions for treatment and operations are careful and explicit.

Forty years after the publication of the first edition of Fauchard's book, Thomas Berdmore of London published his trea-

tise on the "Disorders and Deformities of the Teeth and Gums." Berdmore was a skilful and educated dentist, but his book is essentially a popular treatise, and we find comparatively little of interest to the professional man, especially in regard to practical operative procedures.

He seems to ignore previous writers on the subject by saying, "The work being originally designed for artists who are not much given to reading, and for patients who do not love too much trouble, I have purposely avoided quotations. Indeed, without departing from the subject, I could only have quoted a few French authors who have written to make their names known and one or two English who have translated very injudiciously."

This author strongly condemns replantation and transplantation of teeth, declaring that he has seen very few cases which were successful. He apparently does not question the common belief that a tooth sometimes acquires a bony union with the socket, and states that a fracture in that case is not the fault of the operator. On the subject of dental worms he is explicit, saying, "Worms of the teeth are talked of by some authors, but they do not occur in practice." "Fungus growth of the pulp," he says, "has been mistaken for worms." He recommends the actual cautery as the best means of destroying the pulp, and for subsequent dressing, oil of cloves and oil of cinnamon to be used. He urges discretion in the use of the file, declaring that nothing can be more pernicious than the filing of teeth as is usually practiced. When, however, caries is discovered on the approximal surfaces of the teeth, the file should be used freely and without loss of time.

Filling with gold or tin seems to have been regarded in his time, as in Fauchard's—an operation of minor importance.

In 1771, John Hunter's "Natural History of the Human Teeth" was published in London. Estimates of the value of Hunter's writings differ widely. He was certainly a great anatomist and surgeon, a man of wondrous power, of indomitable will, and of unflagging industry. His powers of observation and comparison amounted to genius, and his work mentioned above is an admirable treatise on the anatomy of the teeth and associate parts. He pointed out clearly the dependence of the teeth and alveolar processes upon each other. This author seems to have been the first to call attention to the fact that the "state" into which every joint most naturally falls, especially when we are asleep, is nearly in the middle between the extremes of motion. "Thence it is that commonly and naturally the teeth of the two jaws are not in contact."

He decided that the dental tissues were not vascular, as they could not be injected, nor could he trace vessels going from the pulp into the new-formed tooth. His experiments in feeding with madder were also negative. From a consideration of these and other experiments he says, "The teeth are to be considered as extraneous bodies with respect to circulation through their substance, but they most certainly have a living principle by which they are made part of the body." He regards the teeth as very different from other bones, in their development and structure. "The cavity of the tooth," he says, "contains no marrow but appears to be filled with bloodvessels, and I suppose nerves, united by a pulpy or cellular substance." He was unable, however, to trace the nerves even to the beginning of the cavity. He perpet-

uated the error that teeth "sometimes ankylose with the socket by bony and inflexible continuity."

In a logical manner he accounted for the necessity of the two sets of teeth, and appreciated the formation of secondary dentin by the pulp as the teeth are worn down, declaring positively that teeth do not grow continually, and explains the fallacious reasoning of those who believe to the contrary. He frankly avows that the cause of caries of the teeth is "hitherto unknown."

Hunter's experiments in the transplantation of teeth are well known, though Professor Gross was in error, as we have seen, in stating that he was the first to perform this operation, as it was not unknown to Ambroise Paré in the sixteenth century, and was also practiced by Fauchard. John Hunter was not a dentist, and operative dentistry received nothing from him.

Space will allow but little more than a bare mention of one other author whose investigations and writings on the structure and development of the teeth were of the greatest value, viz, Robert Blake—"An Essay on the Structure and Formation of the Teeth in Man and Various Animals, being Principally a Translation of his Inaugural Dissertation, Published at Edinburg, September 1798."

Nasmyth says, "He is one of the few authors who have taken the trouble to read their lesson from nature."

Two other important works must be mentioned, viz, "The Natural History of the Human Teeth," by Joseph Fox, 1803, and "The Anatomy, Physiology, and Diseases of the Teeth" by Thos. Bell, 1829.

Fox and Bell were both scholars and skilful dentists. Bell treats more fully of the procedures of operative dentistry than any author since Fauchard, and many improvements in means and methods are seen to have arisen within the hundred years. Bell's work was issued in several editions in England and in this country.

In 1839 Chapin A. Harris published "The Dental Art: A Practical Treatise on Dental Surgery," and in the same year the first dental periodical appeared, namely, the *American Journal of Dental Science*. This publication marked the beginning of a new era in modern dentistry.

Discussion.

Dr. WILLIAM H. TRUEMAN, Philadelphia, Pa. I can fully indorse all the good things Dr. Fellows has said in regard to Fauchard. He knew a great deal, and recorded much that was useful to his profession, but many things, he admits freely, he did not know. That shows he was a wise man. When a man has reached the point where he knows everything there is to know and more too, it shows he has not only matured, but is over-ripe, and is ready for a dose of Dr. Osler's chloroform.

The earlier dentists, Fauchard complains, failed to leave any record of that which they had learned, or of their operations and methods, and it was to remedy this that Fauchard wrote his book. It is indeed a standard book, and may be read with profit to this day. He did more, however, than merely write a book; he stimulated his countrymen to do what their predecessors had neglected to do, and in 1746 his example was followed by Mouton, who wrote, and wrote well, upon dental prosthesis and dental prophylaxis. Some portions of that work might today be put in English, modernized a little, read before any dental association in the land, and be taken up and

discussed without suspicion of where or when it originated.

It was followed in 1754 by Lecluse, on the "Anatomy of the Mouth." Then came Bourdet's book, issued in 1757—a work in two volumes covering the whole field of dental science, sometimes spoken of as being an abridgment of Fauchard. It is, however, an original work. Then came Jourdain, 1778, with a work in two volumes on the diseases and surgical operations of the mouth and adjacent parts —the first text-book on oral surgery. In 1802, Laforgue wrote his excellent treatise, "L'Art du Dentiste." In 1803, a German edition of the same was published, and a second French edition enlarged to two volumes, in 1810. In 1805, Gariot wrote on the "Diseases and Surgery of the Mouth." Baume's work on "First Dentition" appeared in 1806. Lemaire, in 1821, translated Fox's work, and in 1822-24 published his own work on operative dentistry, dental physiology, dental pathology, in three volumes. Delabarre, in 1819, gave the profession an excellent treatise upon the second dentition, and a year later a two-volume work upon the mechanical part of the art of the surgeon-dentist. Maury, 1828, published a well-illustrated treatise upon dental art.

It is not a full list of dental works by French writers during the eighteenth century that Dr. Fellows has selected. It is the more notable ones only, and those entitled to be considered text-books that he has mentioned.

In the English language far less was done. To Dr. Fellows' list we may add Koecker's work, dated 1826, and the notable work by Dr. Samuel Sheldon Fitch, published in New York in 1829. Dr. Fitch modestly speaks of it as a compilation. It was far more, and proved so useful that a second edition was called for in 1835.

I wish to refer to several matters of professional interest associated with the century Dr. Fellows has selected. First, in regard to filling materials. Gold, lead, and tin were in use when it began. It witnessed the introduction of amalgam, brought about in this wise: Mr. W. H. Pepys of London, England, introduced the filling of carious teeth with fusible metal in 1805. While it was measurably effective, and led to the saving of many teeth that otherwise could not have been filled by the ways and means then in use, the heat required for its proper application was very objectionable. To remedy this, Regnart, a French chemist, advised the addition of mercury in 1818, and thus amalgam came into general use.

Mr. J. L. Murphy of London, England, in a work published in 1837, told how to prepare and use an amalgam of silver and mercury, stating that he had used it with much satisfaction for twelve years. He does not claim to be the discoverer, however. Who between 1818 and 1825 discarded the base metals we do not know. We know this, however, that the assertion that amalgam originated with Taveau in 1826 is an error. In his work, "Hygiene de la Bouche," fifth edition, published in Paris in 1843, Taveau speaks of a paste he has used, and which he has named "pâte d'argent" (silver paste), an amalgam of silver and mercury. This he had been using, he says, seven or eight years, and adds that it is the same that some English dentists had been using under another name. He does not claim to be its originator, and he ought to know.

The manufacture of gold foil especially prepared for dentists' use began with Mr. Marcus Bull, then of Hartford,

Conn., about 1816. The first suggestion to that end came from his apprentice boy, Charles Abbey, who later became his partner, and who was the founder of the present firm of Charles Abbey & Sons. Shortly after beginning its manufacture, Mr. Bull moved to Philadelphia.

The treatment of diseased conditions of the teeth with a view to their preservation began early. Fauchard, in the first edition of his work, describes a machine for opening into the pulp-chamber of molar teeth from the occlusal surface. This is also referred to by later writers. Before the century embraced by Dr. Fellows' paper closed, the treatment of diseased conditions of the pulp and the teeth had far progressed.

Porcelain was introduced into dental practice by Duchateau, a pharmacist, about 1777; he had not sufficient influence with either the medical or dental profession to induce them to use or to recommend it. About ten years later, a physician, Nicholas Dubois de Chamant, became interested in it; he was a man of influence, and soon secured its indorsement by the medical profession, and subsequently, by persistent advertising in the public newspapers, by circulars, and in pamphlets, brought it to the notice of the dental profession and of the public. Dubois-Foucou, Fonzi, Audibran, Delabarre, Maury (not the one who wrote the text-book), and others of his countrymen, had well advanced its use before any attention was paid to it outside of France. It was introduced in America by a French dentist, Monsieur A. Plantou, who arrived in Philadelphia about 1817. It was quickly taken hold of by experimenters in different parts of the country, notably Samuel W. Stockton, a watchmaker and jeweler of Philadelphia, and Mr. McIlhenny, a dentist of the same place. By 1828, while it had not supplanted bone and ivory, its possibilities had been demontrated and its future assured.

In his work published in 1746, Mouton describes the gold shell crown for restoring broken-down teeth, and later writers refer to its use.

Ricci, a dentist practicing in Paris, wrote a pamphlet in 1816 entitled "Mémoire sur les dents raciformes ou subériques." In this he describes a method of setting crowns and bridges so as to secure a firm and cleanly attachment to the supporting roots. The roots are filled with fusible metal, the fixture heated, and quickly pressed into place. The peculiar title of this pamphlet has perhaps obscured the method it explains. Ricci's contemporaries say it required so much dexterity that but few succeeded. In these two suggestions, made so long ago, we have the basis of later-day bridge work. The suggestion of Ricci is the first method that protected the root, and secured cleanliness in root-crowning.

Dr. Joseph Head, Philadelphia. Dr. Trueman said that he thought gold foil made especially for the purpose of filling teeth, had been introduced into this country about the year 1816. I have been given the opportunity by Dr. Kirk of perusing a little book written in the German language in the fifteenth century, in which a perfect description is given of how gold foil was used at that time for filling teeth. This little work was written by a man who quoted a method—described by a physician—used, I believe, by the Arabs in the seventh century. I hardly think the method would have been so perfect and the description so complete, had there not been among those excellent workmen, the Arabs, some method of making gold foil.

Dr. TRUEMAN. The use of gold, lead, and tin for the purpose of repairing the ravages of caries in human teeth is so ancient that one might almost imagine that when Adam took Eve to a dentist to have her teeth fixed, the question was asked, Which metal shall be used?

I have a copy of the book mentioned by Dr. Head, "Zene Artzney," dated 1532. Dr. Kirk has one two years older. On the authority of an Arabian medical writer, Johannes Mesue, who flourished about the 9th cent., it is therein stated as one of the means of relieving tooth-pain that the cavity is to be scraped and cleaned with suitable instruments, and filled with gold leaf. John Arculanus is usually cited as being the first to mention the use of gold for filling teeth. I have a copy of his work, dated 1540, in which he says, in the last paragraph of chapter forty-eight, on "Pain in the Teeth," that when other means of relief fail the cavity should be filled with gold leaf. That is all. Arculanus can hardly be considered an original writer, but rather an exponent of Arabian authors whose works were then accepted text-books. These two references carry back the use of gold for this purpose at least one thousand years. Fauchard, however, was the first to describe how it should be used. He directs that the gold be rolled to various thicknesses for use in large or small cavities, and then cut into narrow strips of suitable length. These are placed endwise in the cavity, crowded aside with a wedge-shaped instrument, and then more added as long as this can be done. When no more can be added, the filling is condensed with suitable instruments, properly shaped, and polished. He preferred lead because it was softer, but he nevertheless speaks of some of his gold fillings that had done good service for twenty years. He also used tin.

I had reference, however, not to the use of gold for filling teeth, but to its manufacture especially for this purpose. This originated with Mr. Marcus Bull, at Hartford, Conn., about 1816, or perhaps a few years earlier. So far as I know, he was the first in this industry. Mr. Charles Abbey, whom I well knew, has repeatedly told me the story of how he was apprenticed about 1812 to Mr. Bull, a manufacturer of gold leaf then located at Hartford. Several dentists in the neighborhood brought to their shop from time to time johannes—or as they were commonly called, "joes"—a Portuguese coin made of very fine gold, to have them rolled out very thin for use in filling teeth. On one occasion the use of pure gold was suggested, and later some was prepared and given to a dentist for trial. It was found so far superior to the coin that Mr. Bull was urged to begin its manufacture. Mr. Abbey, who had proved quite expert, had charge of this department. As this specially prepared gold became known the demand for it increased, and Mr. Bull, about 1817, seeking a more desirable location for his business, decided to move to Philadelphia, then the metropolis of the country. All his tools and appliances were placed on board a sloop and brought to Philadelphia by water. It was not long before he made the manufacture of dentists' gold foil his sole business, and Marcus Bull's dental gold foil had a world-wide market. Mr. Abbey became his partner, later his successor, and his product was long recognized as the best to be had.

Section II then adjourned until the evening session.

FIRST DAY—Evening Session.

The meeting was called to order by the acting chairman, Dr. Butler.

Dr. W. R. CLACK of Clear Lake, Iowa, read a paper entitled: "The Necessity for and a Method of Preserving the Integrity of the Interproximal Space." Dr. Clack also showed casts of three cases. The paper was as follows:

The Necessity for and a Method of Preserving the Integrity of the Interproximal Space.

By W. R. CLACK.

IN considering this subject it would seem that every dental practitioner should be so well aware of the necessity of returning the teeth to their original mesio-distal diameter as to make it unnecessary to write any more essays on this topic.

If, however, I am to judge the present state of affairs as existing in our profession by the operations which are continually coming to me for correction, then I am compelled to say that each month all our dental journals should contain one or more essays on the subject under discussion.

My home is in Clear Lake, Iowa. During the summer months we have thousands of temporary residents. For several years a goodly number of these people have consulted me regarding the condition of their teeth and gums.

These summer residents come to our lakeside from every quarter of the United States, so that what I say regarding operations seen in their teeth does not refer to any special locality nor to the dentists in that place, but to all sections of the land. In fact, patients have consulted me who came from the hands of professors in our colleges, members of our dental examining boards, and men very prominent in the cities where they live as well as in our state and national societies.

And what do I find in so far as this relates to the operations on their teeth? That every condition that should bring comfort to the patient and which should lead to the salvation of the human teeth has been ignored.

If there were contacts made on these fillings in the approximal surfaces, in ninety out of one hundred cases the contacts were not points, but masses of metal which extended from the occlusal surface to the gingival margin, and from the lingual to the buccal margins. Where there are such surfaces in contact, we know that the tooth has not been returned to its original mesio-distal diameter, consequently we have no interproximal space.

Modern dentistry no longer consists in excavating most of the decay from a cavity and filling the cavity without regard to the conditions that prevail in normal dentures. The dentist who neglects to correct the faulty environ-

ment that was the cause or result of the initial decay has stopped far short of his duty, and is as criminal as the surgeon who in operating for appendicitis simply evacuates the pus pocket and does not remove the cause of the trouble. The performance of dental operations on the human teeth does not remove the cause of the trouble unless there has been a complete eradication of that condition which led to the original cause of the breaking down of the tooth.

Where the interproximal space is not protected by making a point of contact on fillings or crowns we have a condition which invites disease. Where we deal with cavities in the approximal surfaces and do not return the teeth and parts to a condition of normality we have abnormal conditions, and these always invite disease.

The object of making surgical and dental operations is the same, *i.e.* to change the existing abnormal conditions, thus permitting of a return to the normal. Having given you my ideas of what I feel is our duty to our patients, I shall close my remarks by calling your attention to three cases from my practice.

In attempting to interest other men in any subject we must present either theories or conditions. I do not believe in dwelling upon theories if I can present conditions for your consideration. To this end I have brought with me a number of plaster-of-Paris casts. The conditions illustrated in these casts are copies of conditions I found to exist in and around the teeth to which I wish to call your attention.

The illustrations are copies of the plaster-of-Paris casts enlarged forty diameters. I will pass duplicates of the original casts that you may examine them more closely.

Fig. 1 shows the loss of an upper right first molar, with cavities of the third class in the disto-occlusal surface of the first bicuspid and the mesio-occlusal surface of the second bicuspid. Any attempt at mastication on these teeth was productive of great discomfort and pain. This patient, a boy eighteen years of age, called on me first on March 31, 1905; he came to have the bicuspids and both lower first molars—which were in the same condition—extracted.

Fig. 1.

Fig. 2.

The pulps were removed from both bicuspids and the root-canals filled. A week afterward a gold filling was made in the disto-occlusal surface of the first bicuspid, involving the lingual cusp, the buccal cusp being well supported by dentin. There was absolutely no dentin left in the second bicuspid, so I had to resort to a gold shell crown with long contact points, as seen in Fig. 2. This cast, taken June 17, shows how quickly nature will do her part if we only make it possible. The gum has cuddled down behind the protection of those contact points, and the interproximal spaces are completely filled with healthy gum tissue.

Fig. 3 represents the condition I found existing on July 12, 1903, in the teeth of a patient whose age I did not ask, but

who is a grandmother. You would not expect any restoration of tissue at that age. The upper left first bicuspid was missing; cement fillings had been placed

Fig. 3.

Fig. 4.

in the mesio-occlusal surface of the second bicuspid and the linguo-distal surface of the upper left lateral incisor. Both teeth were pulpless. The architect who made the filling in the lateral incisor evidently believed in "extension and contact," and had as intelligent a conception of those principles as some other men who assure us that they "have practiced those things for years"—for he had his filling in "contact" with the cuspid from incisal surface to gingival margin and he had "extended" his filling until the entire interproximal space was filled with a mass of cement.

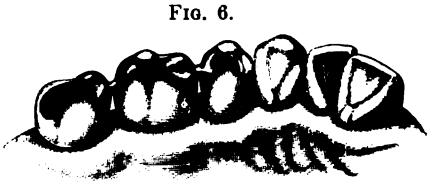
I made the operations you see on July 12, 1903, and the impression from which Fig. 4 was made was taken November 6, 1904. Notice the restoration of gum tissue between the cuspid and second bicuspid.

The patient whose teeth are represented in Fig. 5 was twenty-five years of age when she came to me on July 7, 1902. She said, "Doctor, I want these teeth—indicating upper right first bicuspid and first and second molars—out, and a plate made that I can eat with. For two years I have not eaten a meal in peace."

The teeth on the lower left side posterior to the first bicuspid were missing so that she was compelled to use the teeth on the right side. The second bicuspid was missing. There was a cavity of the third class in the disto-occlusal surface of the first bicuspid. A year or more previously a cement filling had been placed in this cavity over a mass of decayed dentin; cavities of the second class in the mesial, occlusal, and distal surfaces of the first molar, and in the mesial and occlusal surfaces of the second molar,

Fig. 5.

Fig. 6.



had been filled with amalgam. All these fillings were leaking. The filling which had been made in the occlusal surface of the second molar had fallen out.

A refusal on my part to extract the teeth resulted in my making the fillings shown in Fig 6. The impression from which this illustration was made was taken November 7, 1904.

The restored tissue is not a mass of vascular, unhealthy granulations, but firm, healthy pink gum tissue wholly filling the interproximal spaces.

Discussion.

Dr. CLACK. Here is a case that I wish to show, illustrating the other side. I did not make this operation; it was made at a clinic in a dental college. The filling contains one-quarter ounce of gold. I am not telling you whether I think the filling was advisable in this case, but it was most beautifully made and polished. It illustrates the lack of that condition which I deem not only proper, but imperative, if we are to have a healthy condition of gum in the interproximal space. In this case the second bicuspid was missing; there was malocclusion. It was only possible for the patient to occlude those teeth in a disto-buccal direction. I was present when this filling was made, and said to the demonstrator of operative dentistry, under whose directions the student was operating, "Doctor, should not a contact point to be placed on the mesial surface of the filling in that molar?" He said, "No use for it whatever." I contend that there is always use for points of contact between the human teeth. I believe that it would have been better in this case to have protected the gum in the interproximal space; it would have prevented the further shortening of the maxilla and the crowding together of those teeth, still further destroying the occlusion.

I am moved to say a word by a clause in a letter which I received from Dr. Roberts, when he asked me to select someone to open the discussion on this paper. I had said to him, "I prefer you to appoint someone who is opposed to these methods." He wrote me back: "It will be very hard indeed to find any person who will oppose those methods, though he may utterly fail to carry out these principles in his practice." Gentleman, I have no time for that kind of man; he is not an honest practitioner. I have every respect for a man who differs from me when he is honest in his conviction; but the man who will sit still while this matter is being discussed, and in his own practice makes operations without restoring the mesio-distal diameter of the teeth, without the contact points which will protect and restore the interproximal space, is dishonest. He lacks the courage of his convictions. I hope there is no such man in this house. I hope there are men who will stand up and tell us why they make such operations, because some of these casts are copies of operations made by men at the present moment in this room. Others were made by men who are members of this society. I want them to tell us why they do it. It is presuming a great deal more than we have a right to presume —that we are absolutely right, and cannot be wrong, and so it is the duty of every honest man to stand up and make clear to us where we are in the wrong.

Dr. C. M. WORK, Ottumwa, Iowa. I am not altogether in accord with what he calls the plus contact. I believe every tooth ought to be contoured, and some of them a great deal more than nature has contoured them. The plus contact sometimes is a good thing, but I do not believe it is always well to carry it as some do; neither do I think it absolutely necessary in order to secure proper contour and interproximal space.

I think the last cast is rather unfair to Dr. Clack. It does not show what he really did, and it may mislead some of you. He simply made a cast from an impression, but has not restored the interproximal space as he did in his operation. I believe as firmly in the restora-

tion of the interproximal space, as much as I believe in the contact, or more. I think it is necessary for the comfort of the patient, for if it be not done the patient will find so much discomfort that he will wish he had not had his teeth filled. I have one case in mind where the patient said, "As soon as my dentist goes out of town, I am coming to you to have this fixed." I said, "No, do not do that; go back to him and tell him what is the matter." The dentist telephoned to me asking what was the matter, and I was able to tell him. I noticed he restored the interproximal space, and consequently the patient is comfortable today. That was three or four years ago. The filling was all right so far as the margins were concerned, but the contact point and the interproximal space were not taken into consideration in the operation at all. These things are giving more discomfort than the leaking of fillings. No one can masticate properly on a tooth—when eating meat especially—where it crowds in and gives discomfort at the gingival portion of the tooth, and it certainly will happen, if you do not have a proper contact point and the proper interproximal space. I am beginning to think those are the two most important things in dentistry. We may have restored the filling so far as extension for prevention or convenience is concerned, because nature generally compels us to do so; but how many of us succeed in restoring the interproximal space? As I said before, I am not of the opinion that one should restore it to too great an extent, although it is a matter that must be left to a man's own judgment. He must think over it and come to his own conclusion; but if he does not carry it out, he will meet with failures.

Dr. Joseph Head, Philadelphia, Pa. I think it is a good thing to differ with a man sometimes. I do not think anyone who has practiced dentistry will doubt for a moment the value of the interproximal space; but we must remember that Divine Providence made the teeth on a much better plan than we could possibly originate, and when we restore the teeth, if we disregard the natural lines as laid down originally, we must be very sure of our reasons for so doing.

I will take this illustration of Dr. Clack's; I would like him to tell me what harm there would have been in restoring the contour in a natural way. Why has he made these little pin-points of contact? Of course, you say, they are self-cleansing spaces. I have found that the gum underneath remains sore in some of those cases, and it is better, I think, to restore the teeth to their natural lines of contact.

Another thing: He has shown us excellent illustrations of the inflammation that results through lack of proper contour. This condition is very easily explained. There is a point of bone protruding into the interproximal space in every case of this sort. The food becomes impacted on that bone and causes the most profound soreness and discomfort. The only possible help is restoration, and I think it should be secured according to natural lines. We know perfectly well that when we extract a tooth, and the space is the width of a bicuspid, sometimes the gum is sufficiently supported by bone underneath to withstand the force of mastication, and therefore contact restoration is not required.

The principle of contour is simply the restoration of the lines of the tooth according to the original plan of nature, and whenever I do anything in dentistry, my one hope is to succeed in imitating

the original idea that the Maker of things seems to have possessed.

Dr. Wm. Conrad, St. Louis, Mo. I did not hear the first part of the paper, but the subject is of sufficient importance for any dentist in active practice to be willing to discuss. In regard to treating the interproximal spaces, it is a question of the most vital importance, and one of which every conscientious dentist should make a special study. I wish to ask the essayist if in the first part of his paper he made any mention of a preliminary treatment?

Dr. Clack. I think not.

Dr. Conrad. Then I do not agree with the way he works. No one can be a good dentist, a conscientious dentist, or a successful dentist, without the true preliminary hygienic treatment of these interdental spaces, because the disease which has caused this peculiar condition is due to the impaction of food débris, and to a lack of dental hygiene. If we fill teeth without the proper preliminary treatment, there will be a recurrence of food-lodgment, and consequent disease.

I agree with his ideas, but I do not agree with his preparation for the work. Dr. Head made a very dangerous statement. I know he always does it nicely and properly, because he thinks he is right, but he is not right all the time. He refers to Divine Providence, but Divine Providence does not interfere if it is a question of the filthiness of the patient, or lack of care in the dentist. Do you suppose that the Creator, when he made the sixth toe or the sixth finger, did right? Do you suppose when He made the impacted third molar He did right? When you retain to advanced age the deciduous tooth, does He do right? When He causes horns to grow on the ears, does He do right? No, sir. We must interfere and assist where the Creator has made His mistake.

With work of the kind such as has now been described, one cannot make a self-cleansing space that will prevent a recurrence of disease. Dr. Head speaks also about restoring the tooth to the original contour. If he would restore any of these teeth to the original contour, he would leave the space only slightly lessened. Food becomes impacted in the interproximal space, and when once that condition has been established, there will always be a tendency to recurrence. I should treat cases of this kind preliminarily with gutta-percha, packing it deeply into the cavity, and after producing a healthy condition, I would insert a wedge to protect the granulations. Next I would devitalize the teeth, crown them, and solder them together, leaving sufficient surface to protect the interproximal space forever.

Dr. E. S. Gaylord, New Haven, Conn. I feel absolutely incompetent to discuss this paper, from the very fact that when those casts were passed around I condemned every one of them. If I should say anything, it would not be in the line of discussing this paper, but in condemnation of the treatment which has been advocated tonight. In the first place we are shown conditions; what caused them? There must be a cause, and I think it is unfortunate that a man should present such beautiful work as the essayist has done and not show the antagonizing force that in my judgment has probably in all cases produced this condition. We find this condition in many mouths; we see it very frequently, and almost invariably it is caused by an abnormal occlusion. That, I believe, is the first thing to look out for and to care for—to articulate the teeth properly—and

a large majority of the cases will then cure themselves without any assistance from the dentist other than that of bringing them in harmonious inter-relationship. I condemn the principle of devitalizing such teeth as shown in the first instance, viz, the two bicuspids. The devitalization of those teeth, in my judgment, was an uncalled-for procedure. If I had done such a thing, I certainly would not have inserted a gold crown, thereby defacing the mouth. I see no reason why those teeth could not be properly contoured with gold after the articulation was corrected and made as nature intended it should be. I criticize such work very severely.

Dr. G. V. Black, Chicago, Ill. I am very glad indeed to be present and to hear this discussion, and if possible to accentuate its importance. The more we study these matters, and the more we discuss them, the better will be our understanding of them. I think if there is any subject that has been misunderstood and neglected in the past, this is the one that has been neglected most. If we go back to the literature on the subject we shall find that discussion of it is more recent than perhaps some of you may think. It is not very long since the separating file was the instrument used in finishing, and many men who were accounted very good operators prided themselves on finishing fillings in that way; but I hope the separating file for such a purpose has passed out of existence forever—that it is gone from the dentist's armamentarium.

As to the particular treatment illustrated here, I think we may well have differences of opinion. It is exceedingly difficult, even with these beautiful illustrations, for us to see the case as the operator saw it with the patient in his chair. There may be reasons for this or that line of treatment in the view you get from these pictures and from the words that are spoken here, that are different from the view which the operator got in looking at the case itself. In this case [illustrating] I do not know what controlled the operator in cutting away those parts and putting on crowns.

Dr. Clack. The first bicuspid was filled; the second bicuspid was absolutely without dentin, there being none below the gingival margin.

Dr. Black. The point of criticism that struck me most favorably was the criticism as to the smallness of the contact. There are occasional cases coming before us—and this looks as though it might be one of them—where the restoration of the interproximal gum tissues seems to depend materially upon the smallness of the contact; cases where I have often bridged across with a platino-iridium wire instead of building out the filling, for the purpose of dividing the food and causing it to glide buccally and lingually, in that way constantly cleaning the space. It will do it, and those cases will get well with that small contact, whereas they would continue to hold débris, the patient not being sufficiently careful, if we made the contact of the ordinary form.

There is much in the statement that has been made here tonight, that—I will not say Providence, but that nature does not always make things right and where they are not made right it becomes our duty, after a careful study of the conditions, to try to make them so; or, if we cannot make them right, to try at least to do something that will relieve those patients, and allow them to chew their food with comfort. What are we here for? Many of those cases of restoration are

restorations that if well made will serve those patients forty, fifty, sixty, or seventy years, perhaps. Our business is to conserve, and we should remember that it is a conserving that should be for a lifetime if possible. I think the criticism to the effect that the man who knows this thing and neglects it is not honest to himself, to his patients, to the community which he serves, or to his profession, was not too severe. I wish to emphasize this fact, that we have a duty that is above and beyond any money-making—a professional duty that is independent and stands above the mere matter of money-getting in our profession; but when a man has done his duty he is entitled to his pay.

Therefore I say, study this matter of the control and correction of the interproximal space—not only when you find the teeth broken down, but there are other important conditions. Measurements carefully made show conclusively that the ordinary dental apparatus when the patient has reached forty years of age, even though there has been no decay, even though they may appear never so perfect, reduces in measurement, from interproximal wear pure and simple, one centimeter from the mesial cusp of the third molar around the arch to the mesial cusp of the third molar on the other side. The arch has shortened one full centimeter, and in many cases very much more. In that shortening some particular teeth have been worn more than others, the surfaces having become flattened, and the food begins to catch.

If there be any operation that I have done for which patients seem to have been more profoundly thankful than for any other, it has been the restoration to the original form in such cases as these, so that the patient could eat comfortably. It is one of the things that has been continuously neglected. The patient complains of this space catching and holding food year after year. Finally, decay begins near the gingival line where fermentation has occurred, or else disease of the peridental membrane has resulted from that continual crowding of food, and the patient is in a fair way to lose those teeth, and perhaps does lose them prematurely—a neglect in duty to those patients. If we will study that fact with the clear conviction of our professional duty, we are going to save many a patient much misery, and do that which will redound to our credit as a profession.

Dr. J. Y. Crawford, Nashville, Tenn. I did not hear the paper, but some very interesting thoughts have been brought out. If I am capable of judging from the exhibits on the wall, they represent a wide range of trouble for our patients. As to the manner of treating these vicious spaces, I think one of the important points is to first designate the class under which they come, together with the peculiarities of the patient—age, sex, etc., and also the manner of living.

Dr. Clack. Allow me to make a statement here that will throw some light on this matter. I surely thought that any dentist looking at these illustrations would see that that is not the first molar. Look at the disto-lingual cusp there [illustrating]. It is the second molar. The first molar was lost before I saw the patient. In each of those cases this tooth was extracted, and the teeth have partly closed the space, so it was not a question with me of bringing these teeth back. The tooth was absolutely missing, and for want of proper contact the second bicuspid was driven from its proper place, and there was no way of preventing it from

still further drifting but by making these contact points.

Dr. CRAWFORD. The gentleman's remarks simply accentuate what I expected to say. We find one class designated as acquired cases. You may have congenital cases; you may have such a manifestation as the result of a pathological condition. I do think it is all-important to determine what is the cause, in a general sense, which has destroyed the space you are trying to restore and, at least partially, the teeth you are trying to render comfortable. I am inclined to the opinion that many of these cases could be treated by utilizing the inlays or attachments to the teeth, by tying them together, thus supplementing the deficiency of contact and making them serviceable. I am satisfied that in many cases this would be the most effective way.

After the meridian of life, as Dr. Black mentioned, there is a tendency for the original oval or round contact point to become a smooth-worn facet upon the two approximal surfaces. Every careful observer knows that at that time of life as a rule—there are always exceptions—there is a marked tendency for the teeth to move apart, a condition which necessitates a very ingenious operation to swell or enlarge the contact point. I am inclined to think that in many of those cases a better plan would be to insert inlays which, by soldering them together, would afford an interproximal space readily cleanable, if the expression be permissible.

Those cases of tooth-migration I have marked in my mind as the result of pathological changes between the teeth. The gum tenacle acts often as a wedge, pushing the tooth back and setting up an inflammation leading to suppuration, and nature instead of building granulations builds a pocket on the side of the tooth, and when that subsides a hard growth will have been formed. I have sought a long time to impress upon the profession the propriety of attending to these spaces. In full mouths with thirty-two teeth, all of you who have been careful observers have seen spacing and migration of the teeth, the result of so-called pyorrhea pockets being formed between the teeth. Many of these, however, are not pyorrhea pockets at all. I know that pyorrhea is the ordinary definition for pus exuding from the gum, but in a case in which a trauma is paramount in maintaining the trouble, the condition is not, strictly speaking, pyorrhea; it is simply a condition that is often amenable to one treatment, that consisting in scaling the teeth thoroughly and in tying them together.

The maintenance in a normal condition of the interproximal space has been to me of paramount importance in all my professional life. I have insisted upon endeavoring to maintain it, and I never hear this subject without thinking of Webb, who always restored the space to what it had been before its mutilation by the carious process.

Dr. CONRAD. I expect to have some cases of these interproximal spaces to treat at my clinic tomorrow and Thursday. One of the speakers has referred to the fact that he would not devitalize and crown. The point that is of paramount importance is to devitalize some of these teeth in order to assist in the cure where the peridental membrane has become involved. Some cases could never be cured without devitalizing.

Dr. CLACK. The first question asked was, "Are the contact points of hard or

soft gold?" Always—*always*—ALWAYS hard gold! Unannealed gold in that case will not do for small contact points. If it were admissible to make contact *surfaces* that kind of gold might do; but you cannot make contact surfaces and have the condition that I wish to produce there, and that I have produced. If you have big contact surfaces you cannot have the perfect embrasures on the buccal and lingual surfaces of the fillings. Always make the contact points of annealed gold.

A speaker said—and his criticism was proper—that I should have shown the casts of each case in occlusion. I have here the original cast of this lady's teeth just after the operations were made, and it will show that these contact points were very small. I doubt if any are larger than the lead in the point of an ordinary pencil. I had two original casts of occlusion at a meeting; one of them was accidentally dropped and broken, and the other disappeared. That is why I am here without them, and why I cannot allow the other original casts to be taken from the table. The occlusion of all the other cases is here on the table, and may be examined. What appears to you to be a solid mass there at the contact point and seems to be a large contact is in fact a small contact; but the gum has cuddled down so well that it seems to be a solid mass. I assure you that that gum tissue is hard and firm, and I believe that no recurrence of decay will ever take place under that healthy gum tissue Those lines were all extended to the gingival margin. The gum tissue is as hard and firm today as any I ever saw.

In this case [illustrating] it has been asked if the gum was sore. It was. That was the reason the patient came to me, coming from another town because someone had told her that that difficulty could be cured. The lower teeth are all present. The food was crowding into that space every time she attempted to eat.

I think Dr. Head's criticism is somewhat answered when I state to you that this first molar was missing; simply restoring the original condition there would not have sufficed. I was obliged to plus contour, and the smallness of the contact makes that seem more apparent. When I first began to make these contacts I used to make them fairly large; I thought they had to be large to be good, and I did not find gum tissue coming in so perfectly. There would be a little irritation present. After listening to Dr. Black again, I called in some of those patients, and reduced the diameter of the contact points; it was only a short time before I had healthy tissue. I know it is open to the objection that a cantilever is there being set up. But look at the lower bicuspids. If the Almighty does that right along, often making the mesio-distal diameter of the lower bicuspids—how much exceeding the root at the gingival line, Dr. Black?

Dr. BLACK. More than double.

Dr. CLACK. Then I believe we are justified in so doing. The mere fact that my friend Dr. Conrad asserts that this condition will not remain as it now is does not prove anything.

I was not responsible for the loss of the teeth in those cases. I do not extract teeth; it is seldom done in my office, but we have a man in our town—not a dentist who advertises: "Dr —— extracts teeth without pain," and each one of these cases is a mark of the beast.

As to the criticism that this gold crown defaces the boy's face, I cannot make a porcelain crown that will withstand the

masticating stress of that boy when he is eating some of the tough beef we have in our country. He has long lips. This [illustrating] is the second bicuspid. The probability is he will wear a mustache, and I do not think any young lady will ever find out he has a gold crown there, "defacing his face," unless he shows it to her.

I did not devitalize these teeth, although I used to perform such operations. I devitalized many a tooth—and the alveolar process surrounding it. I do not consider a pulpless tooth a devitalized tooth. I consider it always better practice to remove the pulp from any tooth where I am firmly convinced I will have after-trouble, than to soothe it for the time being, only to have the patient come back afterward, and be compelled to bore through one of those crowns and remove a putrescent pulp. I remove pulps, not "nerves," and do not devitalize teeth.

My folks at home have quite a laugh on Dad. I had been working on this paper during the winter, and had been working at the chair several hours a day making these restorations. Some time in March I was taken sick, and had quite a high fever. Sickness always going to the weakest place, my brain was affected, and one night, talking in my delirium, I was trying to make three contact points on a filling in the mesial surface of a molar, and make them all in the right place; so now they say at home, "Dad has 'contact' on the brain." I hope the day will come when every practitioner will have sufficient "contact on the brain" to make contact points on the fillings and crowns he makes for his patients. (Applause.)

I learned something from the last paper we had read in Section II this afternoon—the one by Dr. Fellows, entitled "A Few Dental Writers of the Eighteenth Century." Dr. Black brought this particularly to my mind when he spoke of the separating files. In my old preceptor's office in Milwaukee were several of those instruments, each of which had a great curl on them for going back of the lips and cheek for getting spaces; self-cleansing spaces they called them. I have often wondered where they came from; I found today that in the researches of the gentleman who wrote that paper, he found an authority for this method two and one-half centuries ago—the filing apart of the teeth.

Is it not time that we abandoned some of those "good old practices," and make our operations after twentieth century methods?

A patient came to my office last Friday who lives not a hundred miles from Buffalo. In re-setting a porcelain inlay for her, I noticed that there was absolutely no contact. I took my large pliers and held the porcelain inlay in the mesial surface of the upper left first bicuspid by passing it between what should have been a contact point on a gold filling in the canine and the inlay. I noticed a diseased condition there, and one on the other side, and also one on the lower right side. I said: "Did you never have contact made between those fillings?" She said: "No; my dentist says it is not best for me to have contact in my teeth; that I must have spaces wide enough to remove the food that crowds in there." Her dentist is twenty-seven years old; he must have been taught that within a few years. I know there are men here who are instructors all over the land, but I sincerely hope that the day has passed when a man will stand before a class of boys and advocate the making

of crowns and fillings without making firm contact.

Now, I am a pretty heavy man; suppose I run against the first man that stands over there. If he is standing separate from the rest he must be a very solid man if I cannot move him off his feet; but if he is standing in firm contact with a line that is sixteen deep, what will be the effect? I shall not move him very far. I believe it is the same with the teeth.

Speaking of central incisors separating, I never saw the centrals in the mouth of an adult separate, and remain that way, unless there was a strong occlusion with the lower incisors. While you may hold the teeth there with your staple for a time, if you will restore or increase the mesio-distal diameter of the upper teeth so that the teeth do not occlude, you will have no further trouble. (See paper of Dr. E. A. Bogue, published in the June 1905 issue of the *Dental Cosmos,* page 696.)

I thank you for the extended discussion, especially those who have opposed the methods, because I have gained something from that which I shall try to reduce to practice.

The subject was passed.

Dr. JOSEPH HEAD, Philadelphia, Pa., then read a paper entitled "The Strength of Porcelain When Used as a Tip or Corner," as follows:

The Strength of Porcelain when Used as a Tip or Corner.

By JOSEPH HEAD.

IN displacing gold for porcelain, we are confronted with the question, Will porcelain withstand the force of mastication, not better than gold, but simply, is it efficient? There is no question of comparing it with gold, for anyone knows that in porcelain we have its brittleness to consider; and it is the relative strength and brittleness of porcelain that I have made the subject of this paper.

The principal forces that tend to dislodge a tip are pressure and percussion. These forces in the mouth may be exerted longitudinally or along the axis of the tooth, or transversely, or anywhere between these two. The more the force is exerted longitudinally, and the nearer it is exerted to the cement base, the less tendency there is for snapping of the porcelain. The more the force is exerted transversely and the farther it is exerted from the base, the greater tendency for snapping of the porcelain. Of course, when force is applied absolutely in the axis of the filling, the distance from the base theoretically makes no difference, as there is no tensile strain put on either side, and the only question involved is the resistance of the porcelain substance either to pressure or percussion.

Dr. Jenkins' tests (*Cosmos,* May 1902, page 458) proved that pieces of porcelain 1 centimeter square by 2.3 millimeters deep can stand a steady pressure of from one-quarter of a ton for the Whiteley to a ton for the Jenkins, the other makes falling somewhere within the intervening three-quarters of a ton. Dr. Jenkins tells us the German laboratory in which

these results were obtained and how long it took to make them, but does not tell us how they were made. But I feel that these large figures could only have been obtained under the most perfect conditions, where there was pure compression without the slightest complications of percussion or shear. However, if we could approximate these conditions in the mouth, most of us would be satisfied with the Whiteley quarter of a ton resistance, as it is not likely that the human jaw would care to tax itself more than that.

So much for steady compression. On this point all porcelains are able to take care of themselves. We must, then, look to shear and percussion for its weak points. First let us consider steady shear: For this purpose we have a bar of porcelain $\frac{3}{40}$ inch by $\frac{5}{40}$ inch cemented into a block of ivory and projecting perpendicularly from its surface. These dimensions were chosen because they were felt to be safely above the average size of any tip or corner and yet to fairly well approximate the conditions. The porcelains, unless otherwise stated, were fused on platinum and afterward cut to the proper dimensions on a corundum wheel. They were identical according to the Brown & Sharpe gage within one one-thousandth of an inch. To measure the shear three separate instruments had to be made before friction, jam, and variations in the pull were successfully eliminated. But after much expense of temper and time, this simple apparatus was devised: A smooth, flat surface on a block of ivory was made by means of file, rouge, and scraper; this we shall call A. (See Fig. 1.) B represents the porcelain bar, $\frac{3}{40}$ in. by $\frac{5}{40}$ in., cemented at right angles into ivory block A. The end of block C terminates in the knife-edge of ivory that bears upon the flat side of the porcelain bar at its emergence from block A, and breaks it. Block A was screwed into a vise so that its vertical plane was in the line of gravity; then the knife-edge plane of block C was placed in position at the base of the projecting porcelain B. The planes A and C were in apposition, friction being eliminated by smoothness and oil, and attachments made to the knife-edge of C so as to bring the line of force along the coincident planes of A and C, thus giving the shear exactly at the base of the porcelain bar. When the apparatus was in position in a vise, a bucket was suspended from the ivory block C. When the weight of the bucket showed no tendency to rock the surface of the knife-edge away from the surface of A, the adjustment was considered true, and fine shot was slowly and steadily poured into the bucket until the porcelain snapped, when the shot, bucket, and block C were weighed and the result noted. Block A was then removed from the vise; the porcelain that remained in the cavity was then crushed by a small punch, reamed out with a drill, and another bar of porcelain cemented into position. The procedure was then repeated.

The porcelains tested in this way were Jenkins, Brewster, Whiteley, and S. S. White inlay porcelain.

The Jenkins inlay material obtained in 1900 stood 23, 36, 27, 16, 33, 24, 23 lbs. Average, 26 lbs.

The latest Jenkins inlay material, improved, stood 16, 14, 16, 15, 13 lbs. Average, 15 lbs.

The Whiteley stood 28, 21, 19, 19, 18, 19 lbs. Average, 21 lbs.

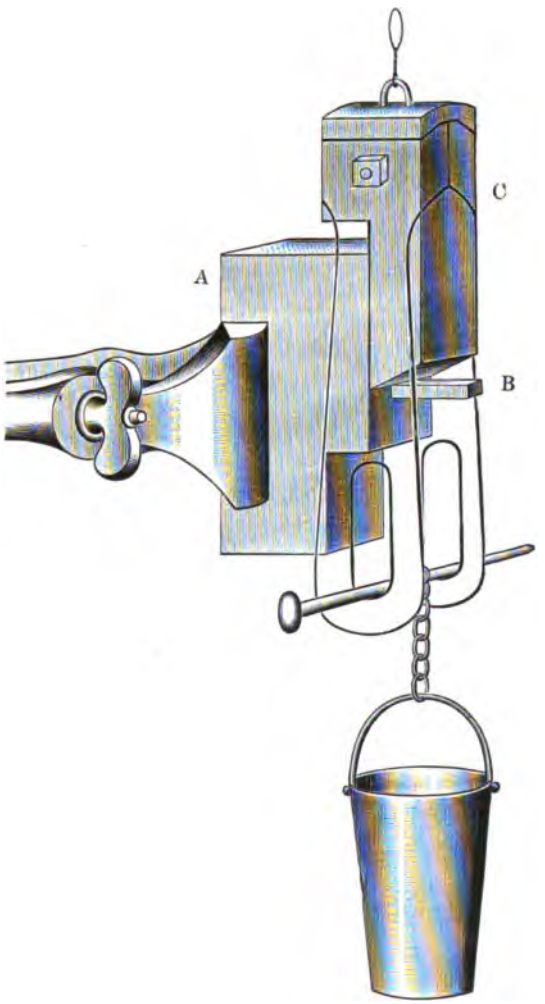
The Brewster stood 15, 20, 18, 23, 19 lbs. Average, 19 lbs.

The S. S. White stood 29, 24, 26, 24, 25 lbs. Average, 26 lbs.

Experiments were made on porcelain bars of Whiteley and S. S. White inlay materials cut from blocks of porcelain that had been made of compressed enamel, resulting in the following figures: S. S. White, 19 and 20 lbs. Whiteley, 14 and 18 lbs.

In these tests the compressed porcelain shows less strength than the uncompressed. It will be noted that the Jenkins improved material had much less shearing strength than the older material, which is probably due to the fact that Dr. Jenkins has used materials that make it a better filling material although it cannot stand so great a strain—which

FIG. 1.

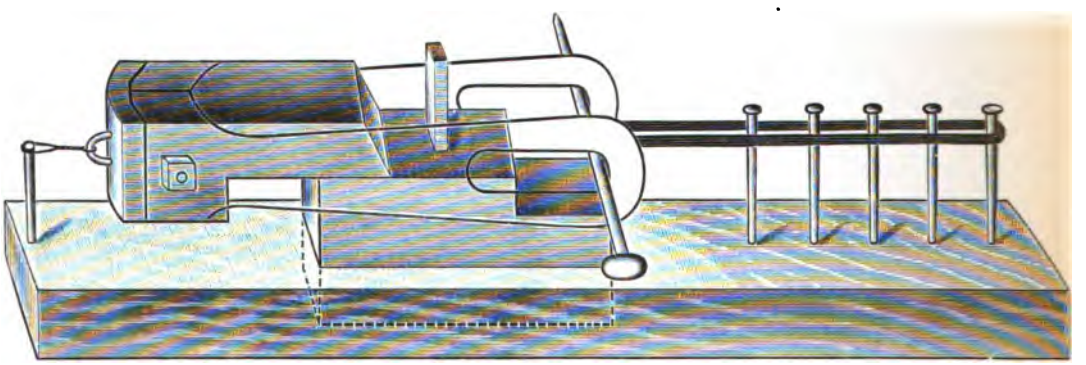


is quite possible, as it will be shown later that the real danger comes from percussion.

It was then determined to find out how much difference would result by making pressure out from the base of the bar. The ivory knife-edge was cut so that it rested on the porcelain bar $\frac{8}{40}$ inch out from its base, and the attachment holding the weight was adjusted to the new plane, and experiments showed that porcelain standing 26 lbs. when applied at the base, now broke at 6 lbs., showing what a tremendous difference is made by a very small leverage. Further tests were made with rubber dam wrapped around the porcelain bar where it rested in the base, and it was found that under steady, direct pressure a springy base-like peridental membrane would make no difference in the amount of pressure required to break the bar; but a percussion blow on a springy base was later found to be a different problem.

Let us now discuss the effect of a percussion blow. The same apparatus was adjusted horizontally (Fig. 2), and instead of weights, rubber bands were used to give the blow. The procedure was as follows: The ivory block holding the bar of porcelain was sunk into an oak board to make a secure foundation. The plane surface in which the porcelain rods were to be cemented was parallel and true with the surface of the board. Nails at small intervals were driven into the board for attachments for rubber bands, which when attached to the ivory wedge would snap it through a distance of ¼ inch or ⅛ inch respectively before it hit the porcelain bar. The force of the rubber bands was so arranged as to draw the ivory wedge perfectly true along the surface of the ivory before it struck the base of the perpendicular porcelain bar. After the porcelain broke, the pull of the rubber was measured by a spring balance. The distance that the plunger was held from the porcelain was controlled by a small loop of string fastened from the head of the plunger to a nail driven into the wood at a suitable place. It was found that perpendicular bars of porcelain hit by a 2-oz. plunger through a distance of ¼ inch broke at a ridiculously low figure.

Fig. 2.



A bar of Jenkins material cemented into the ivory surface with blows through ¼ inch broke at 6, 8, 7, 5, 5, 5 oz. Average, 6 oz.

Jenkins new inlay material broke at 8, 9, 8, 9, 8, 8 oz. Average, 8oz.

The Whiteley broke at 7, 8, 9, 10, 7, 6 oz. Average, 8 oz.

Bars from Brewster body broke at 6, 5, 6, 5 oz. Average, 5.5 oz.

The S. S. White broke at 7, 6, 6 oz. Average, 6 oz.

Bars from old S. S. White tooth broke at 5, 5, 6, 5 oz. Average, 5 oz.

The S. S. White sample made from compressed porcelain broke at 5, 6, 5, 6 oz. Average, 5.5 oz.

I do not care at this time to make any deductions from these figures, but it is interesting to note that in general the porcelain that stood the least steady shearing force has the greatest percussion strength. Also that the compressed porcelain seems to have less percussion strength and less resistance to shear than porcelain made without compression. But it is possible that when we are considering pure compression, compressed porcelain may be stronger and stand even more than a ton. These bars when surrounded by rubber dam instead of cement in the ivory base broke at from 14 to 16 oz., showing that with percussion blows the spring of the peridental membrane makes an increased percentage in force required to break porcelain of about two hundred per cent.

Now we come to the effect of percussion on the surface of a simple porcelain inlay.

The machine is as follows: A ¼-inch square Jenkins inlay filling $\frac{1}{10}$ inch deep was inserted in a block of ivory with Harvard cement. The edges were parallel and perpendicular to the surface of the ivory. This was screwed into a board so that the side containing the ivory was perpendicular to the board. Then a brass plunger headed with a lower bicuspid tooth was projected against the filling through a distance of ¼ inch and ⅛ inch respectively by rubber bands. The strength of the pull of the rubber bands was measured by scales fastened to the back of the plunger.

The results obtained were as follows: The edge was slightly powdered at the first 5-oz. blow; at the third 5-oz. blow a crack ran across the corner. (This block of porcelain, the corner of which was fractured by a 5-oz. blow, was thicker than the block of porcelain of the same material claimed by Dr. Jenkins to have stood a steady pressure of 2020 lbs.) This corner began to be powdered at the fourth 10-oz. blow. These blows were all through a distance of ¼ inch. The same blows were given through ⅛ inch, and it was found that it took 7 oz. to chip the edge.

Another corner was tried, and it took 1-lb. blows to break the corner, delivered through ¼ inch.

The experiment was then tried of cutting a corner free from the cement and ivory, leaving it supported beneath about as a corner of a tooth would be. The first 5-oz. blow chipped it off a little, and then a 22-oz. blow was required to break it off entirely.

This test seemed to prove conclusively that porcelain cannot withstand the percussion force of the teeth—which force, according to Black, can readily vary from 15 lbs. to 250 lbs. It apparently can stand this force and more under steady pressure, especially as this force is usually applied through the intervening medium of food; but we must accept the fact that no porcelain has yet been made that can withstand the ordinary percussion force that at any time may be developed during mastication.

The fillings must be rounded so as to receive glancing blows, the edges must be kept free as possible from strain, and if they chip, as they usually do, in an inconspicuous place, the powdered edge should be cut out with a fine inverted cone bur and filled in with gold or amalgam squeezed in on cement slightly overlapping the porcelain with the metal. The gold and amalgam have flow and can withstand a shock by slightly yielding, and in protecting themselves they also protect the porcelain, which has no flow and can only crumble when its slight elasticity is overtaxed.

I have not gone into the subject of specific gravity, for I have not been able to find that it has any particular bearing. In fact, glass—which is porcelain fused to even consistence—according to Hovenstadt's Jena glass tests seems to resist crushing force almost inversely proportional to its specific gravity. It is interesting to note that all the thirty-five glasses tested for crushing force stood from seven to fourteen times as much as any of the porcelains tested by Dr. Jenkins. It is also of interest to note that the bars of compressed porcelain of S. S. White and Whiteley inlay material did not stand as great a test as bars of the same material molded in the ordinary way without pressure—seeming to show again that great density is not necessarily a factor that makes for strength in withstanding mastication.

These facts seem to point to the following conclusions: Any of the standard porcelains in the market are strong enough if they do not receive the full force of mastication, and none of them are strong enough if they do. So the question resolves itself into which porcelain has the best colors and which is most easily manipulated. I and many others still prefer the high-fusing porcelain, but I am glad that so many excellent porcelain workers use the low-fusing material, as, by our united efforts, dentistry will reap the combined advantages of both.

Discussion.

Dr. L. E. Custer, Dayton, Ohio. I would like to ask Dr. Head about how many of these tests were made?

Dr. Head. About one hundred or one hundred and fifty altogether.

Dr. Custer. Dr. Head is always so scientific in what he has to offer that it is difficult for one in opening the discussion to differ from him in the least; yet I feel there are one or two points that might bear consideration. There are several factors that enter into the problem which Dr. Head has discussed. One is the mixing of the porcelain itself, getting the exact amount within a certain space with regard to outside measurement. Another is the baking of this porcelain. It is not possible to bake porcelain always in the same way so as to obtain the same results regarding both the crushing and the breaking stress. Different degrees of heat to which we subject the same porcelain—agreeing that it has all been compressed alike—will have much to do with the strength of the finished article. So that factor would enter somewhat in the table he has presented; and yet the number of experiments made is sufficient to cover the ground, and produce a fairly satisfactory result.

It is true that the position in which these were held are not as you would find them in practice, and yet the test must show to everyone the points which Dr. Head wished to bring out; namely, the breaking stress of a porcelain filling which had been sufficiently anchored

within the tooth, and that in a contour filling the point of breakage is not through the filling itself, but along the line of union between it and the tooth-enamel—the point where the cement has been gradually washed out and the support lost.

While a porcelain filling may break under very slight pressure, this is due largely to the smallness of the point of contact. Enlarge the point of contact, and I will venture the opinion that in proportion as one increases the actual amount of surface in contact, the amount of pressure will be raised. The greater the surface in contact the greater the stress the porcelain will stand before it begins to crush.

Dr. G. V. Black, Chicago, Ill. I think I will allude to but one point to express my interest in this line of work. It is in the right direction. We need a great deal more of exact experimenting along all these lines; it will bring us abundant fruit after a while. We may not see it at once, but it is leading in the direction that will develop and do us good. Particularly I wanted to allude to his experiments with blows, because his operation with the rubber bands must be regarded as blows. The world has not yet learned how to calculate the stress of blows. Physicists know nothing about it. An effort has been made only at some speculative reasoning on this point. There is a way to come at it, although we cannot yet do so with algebraic equations. We can construct an instrument which in connection with a dynamometer will give us the exact force of the blow. When I say that, I mean the pounds' stress between the mallet and the table when I strike it; not how far I might knock some substance having a certain weight. The rubber that he fastens that filling in with is equivalent to the gunny-sack of shavings that the drayman threw on the sidewalk to break the blow before he threw his box off.

Now, we may by a small machine in which we have control of the weight, which we let fall a definite distance in a direct line, determine the depth that an instrument point of a certain diameter will be driven into this or that metallic substance, and may repeat that effect with a dynamometer, and by measuring the depth and finding them equal get at it exactly in number of pounds. When you have arrived at that you will be very much surprised at the number of pounds a very small weight will give. While the ounces which the essayist has given this evening seemed very small, I take it that when he gets at the actual force of his blow he will find it was not small, and that the porcelain stood an equal stress with the one method of using force that it did with the other.

A three-ounce weight falling three feet striking upon an anvil will give a stress of nearly six hundred pounds. That is a matter of actual measurement. We don't want our toes under it!

Dr. J. Q. Byram, Indianapolis, Ind. I am very much interested in this subject, and have done some experimental work along this line in trying to test the comparative strength of several porcelain bodies. I have not gone so far as to make a comparison between different high-fusing porcelains, but have confined my tests to the difference between the low-fusing and the high-fusing. My tests have been conducted along different lines. I have found that when it comes to a direct crushing stress, the low-fusing porcelain is the strongest; but in any case where a tensile strength is applied, the high-fusing is much the stronger.

This is a point which we must bear in mind. With many of our inlays we have only a crushing stress, while in many others, especially with crowns for bicuspids, we have a tensile strain, because of the interlocking of the cusps which makes a series of inclined planes.

If I may digress slightly a moment—because Dr. Head mentioned something about it—I wish to say that I am an enthusiastic porcelain worker. I am sufficiently enthusiastic to allow Dr. Head to remove two gold fillings that were inserted twenty-one years ago, yet I am not enthusiastic enough to use porcelain extensively for bicuspids and molars. When we consider that it is a friable material, and that it has but little tensile strength, we cannot hope to produce a lasting filling with it in those restorations where we must of necessity have a number of frail margins. Therefore, rather than be called upon to repair porcelain fillings, such as will occur if we insert them in these cases, I believe we should avail ourselves of the gold inlay or gold filling. I assure those who are interested in this matter that you will find these experiments in many respects rather discouraging. We thought a few years ago that all we needed was to make an inlay and cement it in position, and the cement would reinforce it in such a manner that it would have the strength of the natural tooth. But we were sorely disappointed.

I want to back Dr. Head in the statement that one may use porcelain of any variety. The primary thing is to use the porcelain that in the experience of the operator is productive of the best results. I think that they are all about equally strong for practical purposes.

Dr. HEAD (closing the discussion). I agree with what Dr. Custer has said, that this is a subject fraught with much difficulty. I feel that the work I have done is only started, and must be continued; but I brought it here in order that those who were in sympathy with it might work with me along these lines. I feel, as Dr. Black said, that the snap of the rubber bands is a great deal more powerful than is generally supposed. It did not occur to me until he spoke that the mere fact that a seven- or eight-ounce blow would break porcelain, when it would stand up to twenty-eight pounds steady pressure, of itself proved that an eight-ounce blow through a quarter of an inch is equivalent to from twenty to twenty-eight pounds of steady pressure. But then everything Dr. Black says is suggestive, and this subject can be worked out further.

I would say in reference to Dr. Byram's question as to how many of my fillings had to be replaced on the grinding surface, that I knew this subject would come up, and I thought I would look over my patients to give a fair idea of how many fillings I had to repair; I found it to be about five per cent.

When edges that have been caught by opposing bicuspids or molars chip, they chip usually on the grinding surfaces, and are inconspicuous from the outside of the mouth. If they are cut out and filled with gold, they are practically permanent and we never, or hardly ever, have any recurrence of the chipping.

The subject was passed, and the section adjourned until Wednesday afternoon.

SECTION II—Continued.

SECOND DAY—Wednesday, July 26th.

Dr. Butler introduced Dr. I. J. WETHERBEE, Boston, Mass., who read a paper entitled "Tin and Gold: Its Possibilities and Uses as a Filling Material."

The paper was as follows:

Tin and Gold: Its Possibilities and Uses as a Filling Material.

By I. J. WETHERBEE.

THE object of this paper is to present a method of using tin and gold in combination, whereby I believe the valuable qualities of both metals are made use of. Further, some of the features attendant on the use of tin considered by many objectionable are overcome.

In the first place I wish to say that I consider that the value of tin as a preservative agent of tooth-structure has not been sufficiently appreciated in recent years. I believe that its uses and possibilities have been the most persistently neglected of any of the filling materials made use of by the profession.

It seems to me that only an unfortunate experience could have been responsible for an attack made upon tin during the past year, the paper to which I refer having appeared in the July 1905 issue of the *Dental Cosmos*, wherein tin is accused of being responsible for the formation of stannic acid with a consequent blackening of tooth-structure and destruction of the dentinal tubuli, ending in devitalization of the pulp. The essayist also spoke of the tin as being drawn away from the cavo-surface angle of the cavity toward the gold, thereby inviting decay in the space thus occasioned.

To the first of these assertions I will say to prove the formation of stannic acid in any case will require something more logical and convincing than the mere statement without one shred of fact to bolster the contention. As to blackening of tooth-structure as a result of using tin, I will quote from Dr. E. T. Darby, in one of our standard text-books on the subject, wherein he says, "The discoloration is confined to the surface, and the teeth filled with tin are not discolored in consequence of its presence." As to the second assertion, that the tin is drawn away from the cavo-surface angle of the cavity by the gold, I should say that if

space were ever found to exist at that point it was primarily due to the fact that the tin had never reached the destination intended by the operator, for once firmly anchored in position no affinity could disturb the tin.

As it is intended to make this paper a short one, I will proceed to a description of the method I employ in combining tin and gold.

The cavity preparation for this method of tin and gold filling requires no pits or grooves, in fact they are a detriment to the successful packing of the tin in place. Although the modes of cavity preparation necessary for soft gold and tin have been associated, yet I assure you there are a great many cases impossible with soft or cohesive foil which are comparatively easy to fill with tin by using a heated point in packing.

First, a mixture of Abbey's soft gold, varying in thickness from four to eight or sixteen layers, is placed in position next to the tooth-cavity wall, which effectually prevents any darkening of tooth-structure; into this is packed the tin which has been formed into a narrow ribbon from a sheet of foil and cut into pieces the sizes of which vary according to the shape and form of the cavity. It is well to have a slight excess of tin before the work of condensing is started. The most important step in the process I consider to be the packing of the tin into place with a point heated as much as the tooth will stand. It seems to me that in any manipulation of tin this is indispensable, and we must remember in this connection that tin is only one-fourth as good a conductor of heat as is gold. I wish to say with all the force of which I am capable, that to my mind tin owes all of its powers of conservation of tooth-structure to the perfect mechanical adaptation of which it is possible, and absolutely none to any chemical reaction which inhibits carious action recurring. The packing should continue until the desired fulness is attained, when a sharp-bladed burnisher is used to cut away the superfluous tin at the margins, also to cut the entire tin surface till it presents a smooth, bright surface. We are now ready to add our cohesive foil to the tin, which is done by beginning with thin pieces of the foil and burnishing them on to the tin surface by means of an ivory burnisher.

The first pieces must be thin in order to cohere to the tin surface. I fold a sheet of cohesive foil twice, making four layers; from this I cut a portion of the end for the first pieces to be used, then continue folding till a narrow ribbon is obtained, after which I continue as in the case of any ordinary burnished gold filling, finishing with disks and strips.

Discussion.

Dr. H. L. Ambler, Cleveland, Ohio. For at least forty years I have been interested in the subject of filling teeth with tin, and with tin and gold—that is, filling the cervical third of the cavity with tin, and the remainder with cohesive gold,—or a combination of tin and gold folded together in alternate layers.

As I understood Dr. Wetherbee's method, it consists in lining the cavity, after it is prepared for filling, with a mat of five or six thicknesses of No. 4 or 5 non-cohesive gold, held in position with an instrument while the tin foil is introduced by hand or mallet force. After the cavity is nearly full, the tin is covered with cohesive gold. That operation is a good one and I am in favor of it.

This method of lining cavities with gold, in cases where the labial or buccal walls are thin, and where the tin might possibly oxidize a little and show through, is not a new operation. If you refer to a book entitled, "Tin Foil and its Combinations for Filling Teeth," which is used as a text-book in some of the colleges, on page 55 you will find this method recorded; some of the fillings lasted for thirty-seven years. There is a gentleman in this room, Dr. Corydon Palmer, who made such operations a great while ago.

Dr. CORYDON PALMER. It was in 1839.

Dr. AMBLER. Sixty-six years ago! I simply wish to call your attention to the fact that it was a method with which the older men were familiar, but in which many of the younger ones have not received instruction. This method was used in the incisors and canines, as well as in bicuspids and molars, and has proved a success.

Wherever gold and tin are used in a cavity, part of the cavity being filled with tin and part with gold, and both the metals exposed to the fluids of the mouth, an electric battery is established.

The tin becoming the positive element, and the gold the negative, an electrolytic action will be set up, some particles of the tin becoming connected with the gold. This action joins the two masses—gold and tin. After the tin becomes discolored the electrolytic action ceases, and if you ever have an opportunity, as I have had, of obtaining a filling that has been worn in the mouth for some time, where the cervical third was filled with tin, and the remainder with gold, lay it on your bench, then take a chisel and put it at the junction of the tin and gold; strike it with a mallet and see if you can separate them; you will find that it is impossible to separate them exactly at the line of junction. Of course, this firm union of the tin and gold assists in retaining the filling in the cavity, but if you fill teeth in that way, you should not depend entirely upon this electrolytic action between the two metals for holding the filling in the tooth. The rest of the cavity should be of good retaining form.

This method, of filling the cervical third of the cavity with tin and the remainder with gold has been known since 1880, and it may have been used before that time. On page 57 of the same book you will find this fact recorded.

The other method of filling teeth with tin and gold is to take an equal amount of it in sheets of whatever thickness one may wish, and fold it together into tapes, keeping the gold on the outside when a tooth of first-class structure is to be filled, and the tin on the outside when the tooth to be filled is of poor structure. After folding the end of the tape two or three times on itself, insert it in the cavity, fixing it by hand pressure; then fold the tape back and forth, and mallet it with the automatic mallet or the hand mallet. Mallet it layer by layer, and condense it thoroughly, exactly in the same manner as when building up a filling with cohesive gold.

On page 98 of the book before mentioned, you will find that Dr. J. S. Clark of New Orleans, in 1851 made cylinders of tin and gold in alternate layers, and filled teeth with them. Such is the history of that method of equal parts of tin and gold.

The reason for keeping the tin on the outside of these tapes when a tooth of poor structure is to be filled is this: the tin is easily adapted to such a tooth

and makes a tight margin. There is some electrolytic action between the tin and the gold. It oxidizes a little, and this oxid fills up to a slight extent the ends of the tubuli of teeth of this poor kind of structure; a tight filling will result, which would not have been possible with cohesive gold and the mallet.

The method Dr. Wetherbee spoke of—filling with ivory points or pluggers—was introduced by Dr. Shumway. In 1881, Dr. Shumway patented five instruments made of ivory, which he is using entirely for all operations with gold and tin. I had no faith in these instruments until I tried them, and found in their use the easiest way a tooth could possibly be filled with tin or gold foil. Not many of them have been sold, because they are easily damaged, either the points or the corners breaking off entirely. They cost three dollars each, and have never been sold very extensively. With a little experience excellent operations can be made with them. I have given some clinics in the West, to demonstrate these instruments.

There is great benefit accruing from filling teeth with the proper kind of tin foil, because we know that gold as compared with tin is six times as good a conductor of heat, and four times as good a conductor of electricity. This is a large factor in favor of the tin foil, because intense thermal changes will not be carried through the sensitive part of the tooth, and thence to the pulp. Tin foil can be placed nearer a pulp than gold, without impairing its vitality.

It is a fact that recalcification of the dentin occurs under tin fillings. Teeth extracted twenty or thirty years after the insertion of tin fillings have demonstrated that a re-deposition of inorganic materials had taken place. The dentin is hard and of a light brown color. One of our microscopists to whom I submitted specimens says that there is no doubt such a condition existed, and designated it as progressive calcification under the tin filling.

Dr. Chase of St. Louis, and others, used tin forty years ago. In sensitive cavities where they could not obtain sufficient anchorage for gold, they would endeavor to secure a small anchorage, and would then fill with tin. When the tin foil wore out or was removed, they were able to excavate and to fill with cohesive gold, because the cavities were then not so sensitive as formerly.

One thing that has militated against the use of tin foil is the fact that many varieties of it are on the market which are unfit for filling teeth, for many reasons. Of course, as with everything else, some are good and some are poor. With the proper kind of tin foil which can be obtained now, and with the same mallet and instruments as used for filling with cohesive gold, a solid tin filling can be made, beginning at the floor of any cavity in any tooth, and building up the tin foil in successive layers and malleting each layer thoroughly. You can lay the mass on an anvil, flatten it out to a reasonable degree, and it will not come apart. It is almost like a piece of solid tin. I have a lateral incisor in my own mouth that was filled twice in the last twenty-five years with cohesive gold. Both fillings failed. Thirteen years ago I had the cervical third filled with tin and the rest with gold, and that filling is in place now.

I have also a lower left lateral incisor which was filled about ten years ago. That had also been filled twice with gold, and both fillings failed, and I then had the cervical third of that one filled with

tin and the rest with gold. The tin in this case is carried up along the lingual side. The canine laps over on the lateral and you know what that means. I have a disto-occlusal cavity in a molar filled with tin in the cervical third, and the remainder with gold; that is likewise in good condition after many years of service.

I looked over the program, and saw that this subject was to be brought up, so I thought I would bring two specimens. One is a third molar that is filled entirely with tin foil. The tin foil they had thirty years ago would wear out easily in some locations, but the best tin foil today is cohesive under hand or mallet force, as it can be malleted down hard, and it will wear two or three times as long as the old kind. This third molar was in the mouth for thirty years, and it has three tin fillings. The patient was old at the end of that time, and the tooth was extracted together with others in preparing the mouth for an artificial set.

The other specimen is an upper molar tooth with a mesio-occlusal and a disto-occlusal cavity. In the cervical third of each cavity tin foil has been used, and in the remaining two-thirds, cohesive gold. That was worn in the mouth for eighteen years, when again for prosthetic reasons the tooth was extracted along with others.

Dr. S. C. G. Watkins, Montclair, N. J. It gives me great pleasure to be here today, although I am very much disappointed that I did not arrive earlier to hear the paper. I only heard the end of it. Dr. Wetherbee, who read the paper, is the son of Dr. I. J. Wetherbee of Boston, who was the greatest dentist in New England in his day. I remember well when our essayist was born, and I have not seen him since he was two years old; therefore I am specially interested in him, and would have been delighted to hear all of his paper. I draw from what Dr. Ambler said, however, the gist of it. The subject of tin and gold is one I have been considerably interested in for a long time. I cannot go back with tin and gold as far as Dr. Ambler has; but I can go back to about 1881. It has been my practice at different times, in using tin and gold, to partly fill the cavity with tin. There was one thing especially I have learned from experience, viz, if the cavity be partly filled, say one-quarter, with tin and then completed with gold—if the filling be examined in the course of a few years, one will look in vain for the tin; it will all be gone. You have an oxid above the gold, but no tin—not a sign of it; the tin will have completely disappeared, and there will be nothing but a soft tin oxid left. But if you fill the cavity at least one-third, one-half, or two-thirds full of tin, then you will have a perfect filling.

The chemical action is such that the tin will harden and thus improve, where otherwise it would deteriorate. This is a point worth remembering in using the two metals. Use plenty of tin, if you use it at all.

Another point to be remembered is that tin is a very poor conductor of temperature, and in many cases it is advisable and good practice to partly fill an extremely sensitive tooth with tin. I have used it where the pulp was almost exposed, and exceedingly sensitive; I half filled the cavity with tin, and then with amalgam or gold, and there would be no thermal trouble—no pain whatever; whereas if it had been filled with any of the other metals, there would have been great suffering from changes of temperature.

The lining of the cavity with gold before the tin is inserted, is something I have practiced for a long time, and it is an excellent thing to do; otherwise the oxidation will discolor the tooth to such an extent that it will be unsightly—the gold will largely prevent that.

Where the gold and tin are rolled or folded together, less discoloration will be noticeable through the tooth. Old Dr. Lord of New York, during his lifetime used that method very largely, and he felt that such was the true way to use gold and tin. I have not used this as much as the other method. I have felt many times that I would use it more often, but you know how one gets into ruts, and will practice the method to which he is accustomed in preference to others. I really believe that the rolled or folded method would be preferable.

Dr. F. W. Stiff, Richmond, Va. I gave a clinic today on the use of what is mainly tin, I presume. It is a preparation made by Ivory—his "crystal alloy." I have been using it since the Asheville meeting, with pleasure to myself and comfort to the patient. The adaptability is better than gold, and the non-conductivity is superior as compared with gold or amalgam. I find I can place it much nearer the pulp than gold or any other permanent material. I have had no experience with the use of tin in conjunction with gold in the folded form, so I cannot speak on that point.

I am much pleased with the use of tin as prepared by Ivory, as it is shredded. I do not know whether it is entirely composed of tin, but it must be mainly so. It is adapted as easily as DeTrey's or Watt's gold. In the operation today, the cavity was partly filled with this preparation and the rest with Watt's gold. I was pleased to hear the commendation of tin and gold by the gentlemen who have spoken on the subject.

Dr. Burton Lee Thorpe, St. Louis, Mo. I want to add a word of indorsement regarding Dr. Stiff's remarks. Ever since the death of Dr. Jerry Robinson of Detroit, the man who put on the market fibrous tin, there has never been so near an approach to an ideal preparation of tin as Ivory's. It is easily adapted to the cavity walls, is a non-conductor of thermal shocks, and is a very good preparation for lining deep-seated cavities in vital teeth. Gold malleted on it forms an absolute and perfect adhesion. To my mind it is one of the best pulp-protectors. Its only objection, that I have discovered, is that in using it on damp days in combination with annealed gold, an electrolytic action is produced when the gold, carried on a steel instrument, comes in contact with this fibrous alloy.

The therapeutical value of tin as a filling material is inestimable. Probably the best tin foil at the command of the profession today is Ambler's "cohesive tin foil." This I have experimented with in my practice and at my college clinic, and find that its ease of adaptation and non-conducting properties make it an ideal filling material especially adapted for children's teeth.

Dr. Corydon Palmer, Warren, Ohio. I am personally opposed to the use of a combination of filling materials in the same cavity. I like a clean thing, a clean filling made entirely of pure tin or gold.

Let me say what I saw at the clinic today. You must take me as I am, because I am independent. I began 'way back in 1839, and I am not indebted to any man living, or any college, then or now, for any tuition or diploma. I am

an outsider; I made my own way, and am independent today. The Board of Examiners called me, and wanted me to give them items in my history; I refused to do it. I say I am not under examination. I was young when I began. I made my own instruments. My judgment and ingenuity guided me. I obtained some gold from Charles Abbey, in Philadelphia, who was then the notable foil-maker. Excuse me for branching on to gold, but it is connected with what I want to say. The gold made by Charles Abbey was of a dark tone or color and was good as long as one used it with hand force. We had a tin foil made by Charles Abbey that was called chemically pure tin. I had some of it, and I saw a filling made of it; but I did not like it because it was of a dark color, and when the teeth were filled with it it cast a dark shadow between them.

I want to tell you that anything mixed with the tin does not make a good foil. Any preparation of gold that is made by precipitating it and making it into sponge gold, and all these different forms of gold, does not make a good filling. If you want a good metal that will be fine, tough, and brilliant, it must go under the roller and that puts life into it. If you want a good tin foil you must have the best quality of tin that can be procured, and it must be made by beating it, which toughens it but without corrugating it. Have the foil clean, and a nice metallic surface will be the result.

My dear friend, Dr. Ambler, has gone over everything concerning tin. There is an advance in the use of tin. He knows a way of using it so as to render it cohesive. Since my time of using it he has found that out, and a filling thus made will be harder, and will stand more wear than one made according to the old method. The old way was to make it into cylinders, either by folding it into a rope or by twisting it. Speaking of Dr. S. C. Clark of New Orleans, he was the first man who ever proposed the use of metallic cylinders for filling teeth.

When I first began practicing I found out that if very sensitive cavities are filled with gold they will hurt to such an extent that eventually the pain becomes unbearable, and that if they are filled with tin they will remain comfortable.

One is a greater thermal conductor than the other, and the exposed living surface cannot bear it.

I wish you might know what a nice clean tin foil is, that has not been handled. That makes me think of what I saw today, and at other meetings. Men will take a sheet of foil and crumple it all up in their hands, push it up, and wind it around an instrument and then stuff that into a tooth. If they just would take that and hold it in the flame of a spirit lamp and see the white smoke come off it, they will then know what they are doing. You must not put anything into a tooth that you handle with your hands; some people's hands perspire more than others. It is not a nice thing to do. Keep it away from the atmosphere and do not handle it.

Dr. W. G. Ebersole, Cleveland, Ohio. The only side of the question I wish to speak on besides indorsing Dr. Ambler and Dr. Palmer, is that from the humanitarian side. I come from a section of the country where I have witnessed the work of some of the men who have talked to you this afternoon. I know what tin will do. No one has said it would save teeth better than any other filling, but those of you who are accustomed to watch the workings of tin know that it is very rare to see any recurrence of decay un-

derneath a tin filling. This you cannot say of any other metallic filling.

Dr. Watkins brought out a very important side of the question—the ability to place this filling material close to the pulp without afterward producing any disturbance from thermal changes. When he spoke of filling the cavity one-quarter full of tin, and the trouble that had followed, I thought he was going to be an anti-tin man; but I was gratified to hear him say we should use at least one-third tin. In the *Cosmos* for November 1905 appeared a paper from one of the men from the Northwest, condemning tin. I am going to say to you that that man, and the men who take the stand he takes, do not understand or know how to use tin.

Dr. M. ALBRECHT, Indianapolis, Ind. I did not hear the essay, but I heard something of the discussion about tin and gold, about filling part of the cavity with tin and finishing with gold. You have used the word "conductivity." Am I to infer that the combination of tin and gold is a non-conductor of thermal influences? If that be the case, I feel I have a better method to suggest, which I have been using for years, and it is strange to me that any observing practitioner should not have mentioned it before. It consists in filling large, deep cavities partly with cement, leaving a sufficiently large portion of them unfilled, in order to finish the operation with metallic foil properly and securely anchored in the cement-based cavity.

Tin foil is not as good a protector as cement. Gutta-percha does not make a good foundation. It is like building on a sand foundation. You have not convinced me of the utility of the combination, I must confess. The characteristics of tin and gold are different, and what may be gained from the combination I do not understand, unless it be cheapness. Anyone who claims that the combination of tin and gold will make a superior filling, is laboring under an hallucination. We have seen gold fillings that have lasted ten, twenty, and thirty years, and even longer. Tin fillings have lasted years, but in what way the combination of the two metals is helpful I fail to see or understand.

Dr. WETHERBEE (closing the discussion). It has been a great pleasure to hear so many remarks made favorable to tin. I cannot help experiencing a feeling of mild surprise that there have not been more dissenting opinions, especially in view of some rather bitter attacks made on the use of tin during the past year.

Dr. Ambler's theory of electrolysis by which he explains the wonderful strength at the point of union of the two metals, seems most plausible.

The method which I employ in combining tin and gold is known as the Shumway method; malleting at any stage of the operation is excluded, for the reason that the tin can be as thoroughly condensed by heated plugger points, and to mallet gold on a foundation of tin (as it is used in this method) would cause disturbance of the tin owing to the difference in density between tin and gold.

The section then adjourned until Thursday afternoon.

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DENTAL SCHOOL

SECTION II—Continued.

THIRD DAY—Thursday, July 27th.

The meeting was called to order by the secretary, Dr. Butler. Dr. M. F. Finley, Washington, D. C., was invited to occupy the chair, while Dr. Butler read the paper of Dr. C. MILTON FORD, New York. entitled "General Dental Education":

General Dental Education.

By CHARLES MILTON FORD.

THE first essential to successful work in the education of dental students is to secure a higher and uniform standard of preliminary educational requirements, and to insist on the preliminary requirements being fully completed before the student is allowed to begin his dental course.

In New York state the present preliminary requirement of four years of high-school work (proof of the successful completion of three years of which must be furnished before the student can begin his first year toward the degree of D.D.S.) will assist us greatly in raising our educational standards by giving us a better trained set of students with which to begin our work. This requirement can be much improved by designating a well-selected set of subjects which the dental student must take during his third and fourth years' work in obtaining the dental student's certificate. Included in this list must be a liberal number of hours of suitable technical work, thus starting the preparation of the eye, brain, and hand for the future dental work. Given students with a good fundamental education to start with, the task before us becomes much easier.

The three years' course of eight full months per session will be our basis for the present consideration; for it seems to me that we must first put our increase of time on the length and thoroughness of the preliminary work.

When we have secured the correct balance of preliminary work, then and then only can a four years' course be maintained to the advantage of the student; and it is from the basis of the best interest of the student that we must consider this matter.

In other words, the extra year can bet-

ter be expended today in preliminary education than in adding one year to the course in the dental colleges.

When the time comes that we can demand a uniform preliminary requirement greater than four years of high-school work, completed before the student enters upon his dental course, then and only then can we advantageously increase the number of years in our dental course.

The methods of dental instruction have materially changed within the last fifteen years. In the old practice of placing freshmen, juniors, and seniors in the same lecture-room, and repeating the same course of lectures to all of the classes for three years in succession, various modifications have been introduced from time to time, probably the greatest change at the present time being the method of substituting recitations for lectures.

The mixing of classes has been largely done away with, and in most institutions the classes are separated in recitations and lectures. This is certainly a very great stride forward, for by this means the instructor is able to grade his course, save much time for his students, and produce results much more satisfactory to all concerned. In the realm of successful instruction the personal element is a very decided factor. Comparatively few men are good instructors, and the quicker our large institutions adopt the plan of selecting teachers according to the results produced in the class room and not according to the great reputation or amount of influence that a man may have, the quicker will our educational work take rapid strides forward. The man who can induce the student to learn well the groundwork of his subject and then place upon that groundwork a substantial superstructure is the man for the professorship in that subject.

The professor should do the essential work of instructing each class in the foundation work of his subject, for on the proper laying and shaping of this foundation work depends largely the success of the average student. The method of accomplishing this result will vary greatly and the instructor himself must select his methods. One instructor will find that he can obtain better results with his classes by lecturing to them for one-half of the hour and then quizzing them for the remaining half hour on the subject lectured upon the previous day; while another man will accomplish the same result by giving his class a certain lesson in a text-book or abstract of a text-book, and requiring the members of the class to learn the lesson, and then at the time of the recitation as occasion demands, supplementing the text by short explanations and thus impressing certain points upon the minds of the members of his class. In reality these two methods closely coincide. In the one the ideas of the instructor are given, largely to the exclusion of other opinions, while in the latter the opinions of the author of the text-book are brought out and the instructor's opinion and corrections added. Both methods have their merit, and the preference of the instructor and the nature of the subject will largely determine the method to be selected. In most subjects where good text-books are available the recitation is better and more effective and can well be supplemented at intervals by short lectures.

If the text-book be not sufficiently condensed to suit the case in hand, this defect can be overcome if the professor will write a synopsis of the subject under consideration and give it to the students as

a guide to their study. The use of a synopsis has many advantages because most of the text-books of a dental curriculum are too extensive. The synopsis gives the student a basis for the condensation of the information contained in the text-book, and produces good results. This is the method that I have followed for some years with my classes.

The method sometimes used where the professor lectures to the class and at some future hour has his assistant quiz the class on the subject-matter of the lecture is very ineffective. The man giving the lecture is the only one who can quiz on its subject-matter with good results; for the ideas of the assistant will creep in and the student become confused. By turning over the quizzing of the class to a subordinate the professor furnishes the class with inferior instruction in the most important part of the work. It is the professor, and he alone, who should give the instruction to the class upon the essentials of his subject, whether it be done by lecture and quiz or by recitations, and he should not relegate this work, or any part of it, to subordinates.

In quizzes and recitations the classes should be divided into sections of thirty, not to exceed fifty in number. In such sections the personal element of instruction is brought out, the professor learns the peculiarities of each student in his class, and can draw out and correct the errors of each individual producing results not to be approached in classes of a large number of students.

Various methods have been tried to keep the whole class of one hundred or possibly one hundred and fifty students interested, but they have all been failures, great or small, largely depending upon the capabilities and versatility of the quiz-master. If you have not tried the small class method, take one class and divide it into sections of about thirty men; push these sections, giving each section as much time as you formerly gave the whole class, and after a two months' trial you will never consent to return to the large-class method of teaching. It is true that you have given more time to the class in the classroom, but it is the benefit of the student and the result that we are seeking, and in so doing we must lose sight of the instructor's time to a large extent.

As stated before, the faculty must be made up of men having the gift of teaching, who can compel as it were the student to grasp the basal elements of the subjects taught. These men are largely found in the middle class of hardworking men who are known as all-around men of good judgment, not in the class of brilliant men who have attained a world-wide reputation in some special line of work.

The members of the faculty must also be able to work in harmony, for one man not conforming with the general plan of the faculty will materially injure the work of the whole body. Students placed under the instruction of such a faculty for the groundwork of their college course will advance rapidly. The work of the faculty must be well seconded by lectures, and in some instances by short courses of instruction given by men of large experience in their specialty. To this end the faculty should be aided by a large corps of lecturers and clinical professors. In this field, after the foundation has been laid, the specialist is of untold value and the combination is essential.

After securing a teaching staff, there follows the arrangement of a schedule of recitations and lectures giving the best

division of time for securing the broad education of the student.

The first two years of the college course should be largely given over to laying the foundation of the student's work in each of the regular subjects, and should consist of hard classroom and section work carried on by the professors of the regular branches.

It is of the greatest importance that this work should be well carried out, as a class poorly started in these subjects will continue to do poor work throughout its college course. Most of the work of the first two years can best be accomplished by dividing the class into sections of thirty—not to exceed forty—students, and instructing the sections by recitations and demonstrations or by lectures and quizzes as the subject may warrant or the instructor may elect.

During the third year the higher branches must be completed, and much special instruction in the dental subjects must be included.

The didactic instruction may well be arranged in the following order. In the first year the foundation work in anatomy, physiology, chemistry and physics, operative and prosthetic dentistry must be pushed forward and the study of histology completed.

During the second year the instruction in anatomy, physiology, chemistry and physics and the foundation work in the purely dental subjects must be completed, and the study of materia medica and oral surgery begun. In the third year the study of materia medica and therapeutics and oral surgery must be completed, and the regular instruction in operative and prosthetic dentistry must be broadened by a large number of special lectures and demonstrations on important dental subjects.

In the didactic portion of the operative and prosthetic branches of the three years' course the instruction must be so graded that it will keep pace with the work of the different parts of the infirmary and of the dental laboratories.

Much benefit to the student may be obtained by the introduction of written recitations, in all of the regular subjects of the course of instruction, at intervals of from four to six weeks, throughout the session. These written reviews prepare the student for the final examinations and enable the instructor to judge of the progress of each student at frequent intervals.

The mid-term and final examinations in the didactic work of each subject are essential to the grading of the students of the different classes. Yet except at the completion of each branch, it is probably as well to excuse from examination all students having an average in their classroom work for the session of over 85 per cent. This is an incentive to good regular classroom work throughout the session, and will accomplish more than the examination in keeping up a high standard in the college.

Special laboratories. Among the special laboratories that must be maintained, those of physics and chemistry must be well equipped, and the special courses in these subjects must be completed before the end of the second year.

In histology the instruction should continue through the first year and consist of recitations in which the characteristics of the different tissues of the body are studied, special attention being given to the structure of the teeth. These recitations are followed by a practical course of instruction in the laboratory, where the student studies the processes of preparing the different tissues for examina-

tion and the characteristics which they present under the microscope.

The pathological course following takes the place of histology during the second year, and here the student studies the pathological conditions found in the body, and in the laboratory these conditions are shown under the microscope and compared with normal tissues.

In bacteriology the instruction should be given in the second year, and should consist of a thorough study of the characteristics of the different forms of germ life, especially of those forms found in and about the mouth. This course is completed by laboratory work in which the student studies the growth, appearance and preparation of the different species for examination under the microscope.

In the materia medica laboratory during his first year the student is shown the appearance and characteristics of the different drugs in common use.

The instruction in metallurgy is given by a course of lectures illustrated by practical work in combining and separating metals in the metallurgical laboratory.

Infirmary and dental laboratories. Here we have the key to a successful course of dental instruction, which should consist of a thorough graded course of practical instruction occupying at least three hours of every working day throughout the college year.

To facilitate the successful operation of this department of instruction, great care must be exercised in the selection of the members of the infirmary staff, as upon the efficiency of their work depends much of the success of the future work of the students who are placed under their charge.

The infirmary work of the first year is largely foundation practical work in the operative and prosthetic laboratories, the time being divided about equally between the two laboratories.

During the early part of the second year the operative work in the laboratory should be perfected and the student sent to the chair for cleanings, treatments, and the preparation of cavities, and later on for amalgam and small gold fillings.

The regular prosthetic work should be mastered and completed during this year, the latter part of the year being devoted to practical work for patients.

In the third year the greater part of the student's time in the operative department should be devoted to the treatment of operative cases at the chair. The instruction should be painstaking and thorough, covering all of the important operative procedures. The special prosthetic work should be completed, special attention being given to the making and setting of crowns and bridges. The practical instruction of this year should be supplemented by a large number of clinics and clinical instruction embracing all of the special operations about the teeth.

The student should be passed from one department to another in his year's work as fast as he becomes proficient in the work of that department, and not because the time allotted to that department has expired. This procedure can only be accomplished by a thorough graded course of instruction for each year.

The motto of the whole infirmary course should be quality not quantity, and the student should be held to each piece of work until he has mastered it; only thus can he become a successful operator and practitioner.

Discussion.

Dr. W. G. EBERSOLE, Cleveland, Ohio. I expected to say something in regard to this paper, but owing to the lack of an audience, and the desire to have the next paper read, I think best not to say much with regard to the general educational side of the question. The part I am interested in is what we are pleased to call the humanitarian side of the question, and those of you who have listened to the paper have noticed that no provision has been made to look after that all-important side of dentistry. It seems that the essayist and the profession in general have forgotten the question of so much importance to our patients—that is, the side of dentistry which pertains to the elimination of pain from our operations. I am well aware that when I refer to the prevention of pain I produce much the same sensation as decayed fish would upon the olfactory nerves; but sooner or later, and the sooner the better, it will be considered just as inhuman to place a patient in the chair, adjust the rubber dam, and excavate a sensitive cavity without using some obtundent successfully, as it would be to place a patient upon the operating table, strap him down, and remove an eye. That day is not far distant, and when it comes, then you can talk, as was suggested yesterday, about going abroad and asking for recognition; then you can go before the medical profession, as was suggested, and get their sympathy in your work; but so long as humanity in general must seek dental operations under compulsion, and seek them only to submit to one torture to avoid another, just so long will we fail to receive the proper recognition that our profession demands.

The public in general demands at our hands that we give them first-class operations without causing pain or inflicting torture. If we look through our excellent program, we find nothing in all this great meeting devoted to the study of that side of the question. We have had from the great Northwest a club of men brought here to teach us how to prepare cavities, how to put in a certain class of fillings. I have nothing to say with regard to their work, and their preparation of cavities. Their work is fine, and their preparation is undoubtedly correct; but those same men, by employing the methods they do, cause the loss of far more teeth than they can possibly save. And why? How many of those who operated yesterday and this morning will take a seat in the chair as patients, and submit to the operations themselves, as they performed them?

Those men save the teeth they operate on, in all probability; but by the torture they inflict upon the patients they cause the loss of far more teeth, because humanity will not submit to that torture. We save as dentists a very small proportion of the teeth that need our attention, simply because we have forgotten that we are not working upon a block of wood, as a carpenter works upon it, but upon living sensitive tissue.

I simply want to say that the time has come when that side of dentistry must receive more consideration than it has in the past, and when it does, we can ask for proper recognition.

Dr. R. T. OLIVER, West Point, N. Y. The point is a good one, but does not seem to refer to the paper.

Dr. EBERSOLE. The paper was in reference to the education of dental students, and my contention is that students should be taught this side of dentistry.

Dr. OLIVER. This is indeed a most

excellent paper, and it is too bad its author could not have been present to receive our congratulations.

The essayist advocates an exceedingly rational method of teaching students the rudiments of dentistry, for we must remember that, at best, all the college can expect to do is to prepare students for the real education that comes after graduation, when they are thrown upon their own resources.

There are some theories advocated in this paper that many of the old-time teachers cannot readily accept; for instance, the elimination of the practice of delivering lectures on the various subjects.

In lieu of this time-honored custom, he prescribes a didactic course which may do very well with some subjects that have complete and lucid text-books, but in my opinion this exclusively cannot be considered adequate for all subjects of the curriculum. Such subjects as anatomy, physiology, materia medica, therapeutics, and the like, may perhaps be better taught in the manner described, the teacher laying down a certain number of pages to be studied, and afterward conducting a quiz upon the matter covered. But how many teachers of operative dentistry do you suppose there are in this country, who follow any one or even two text-books in their teaching? Very few, if any.

They must read everything that can be procured on their subject, keep abreast of all the literature and periodicals of the day, learn all the new theories brought out both at home and abroad, and then from this mass of stored knowledge, impart what is thought best for their students to know.

There is no inflexible rule that can be laid down for teaching any subject, nor for each individual teacher to follow, as the best method of imparting knowledge largely depends upon the individual's own selection.

Personally, I am inclined to favor a combination of the two general plans of teaching in all subjects, except those few of a fundamental character for which we have adequate and complete text-books. A thoroughly competent professor, conversant with all the various theories and methods of the different text-books, a good talker, and a man who invariably makes a practice of keeping in step with the giant strides of the profession's advance, should hold the chair. He should deliver a full and complete course of lectures to the class, with one comprehensive quiz each month in review, holding two written examinations during the term—one mid-term and one final. There should also be a competent assistant to the chair, an adjunct professor, whose duties should be to outline a didactic course from one or more prescribed text-books and to conduct quizzes on the subject-matter thus covered.

In this manner the entire subject can be pretty well embraced, and the student brought to an understanding of all the essential points in the fundamental knowledge of any particular study.

In those subjects where practical clinical demonstrations are possible, it is of course necessary to have a corps of able demonstrators to handle small sections of the classes, so that each individual may be assured of receiving a full share of close personal instruction.

I hope to hear a liberal discussion of this important paper, especially from the college men whom I see among us, for although not actively engaged in college work during the past four years, I was for the ten years preceding, and am still

numerically, nevertheless a scale may be arranged from them.

We found with a mixture of pure gold and platinum that for every five per cent. more of platinum the temperature is raised about 105 degrees Fahrenheit.

The determinations, however, became uncertain with more than 25 per cent. of platinum, as it requires a heat above 2500° F. to fuse the pellet. The temperature corresponding to the melting-point of an alloy, say of 85 per cent. of pure gold and 15 per cent. of platinum, would represent a degree of heat of 2330° F.

On account of the durability of the alloys this method of measuring temperature is not expensive, and I assure you it will meet our requirements.

We will next take the composition of a few of the porcelain bodies, giving the results of the investigations we made.

Professor Seger says: "Even if nature does not grant to the human eye a look into her most secret workshops, if she does not show how she changes clay into shale, sand into sandstone, or forms a crystalline lime or marble out of the deposits of calcareous shells; if she has not, up to this time, permitted us to determine the conditions under which, in heaps of detritus formed by friction and weathering, the like constituents move to certain centers of concentration and become new crystalline formations; yet speculative science, by a comparison of the products upon which these unknown influences have worked for an unlike duration of time, or with unequal intensity, furnishes a hold as to how these may have originated and brings us closer to the workshop of nature—for the most part not accessible for direct observation."

However valuable the data which the physical investigations of clays offer in regard to their behavior in the plastic condition in soft burning, or the chemical analysis for the recognition of the constituents which prove harmful in the manufacture, as in the investigations of Bischof for the judging of the degree of fusibility, nevertheless these investigations do not yet suffice in all cases for characterizing sharply the nature of a porcelain, and it happens often that the scientific results and the discoveries of practice deviate more or less from one another.

The cause for this is found in the fact that the chemical and physical analyses allow only a few mutual relations to be seen and do not give information concerning all conditions. The physical analysis teaches us to know the relation between the porcelain substance and the mineral fragments, and explains a series of phenomena that are more or less independent of the chemical composition. The chemical analysis gives us hardly any information concerning physical properties, and for the behavior in high temperatures conclusions are only possible under the supposition that all substances indicated by the chemical analysis can enter into it.

The chemical analysis of the porcelain we are using may be of some interest to the profession. At least, we were so much interested in its composition and action under heat that we had four of the different porcelain compounds analyzed, and herewith I give the percentage results:

	No. 1.	No. 2.	No. 3.	No. 4.
Silica	66.95	77.52	71.10	68.86
Alumina	16.70	11.25	12.3	1.87
Lime	2.10	1.42	2.13	1.70
Magnesia	0.30	0.30	0.30	0.30
Alkalies	12.35	8.39	10.64	25.59
Tin oxid	..	..	Trace	1.30
Loss on ignition	1.60	1.12	1.48	0.38

The research we have made from the great publications of Professors Seger, Brogniart, Bischof, Richters, and others, on the study of the physical properties and the relation of these to the chemical composition leads us to conclude, as regards the character and action, when found, of the above four porcelain bodies, approximately as follows:

No. 1: As reported this consists of approximately 96.50 per cent. of the feldspar albite, and 3.50 per cent. of hydrated calcium oxid—slaked lime. (Albite is a feldspar, usually of a white color, containing soda instead of potash.) The feldspar alone fuses at a high temperature to a white glass. The addition of the small percentage of lime would make the mixture more fusible and also more opaque.

There would be no chemical action in fusing the feldspar, and the lime would chemically combine with the silica upon fusing, forming a silicate of lime.

No. 2 consists of approximately 75.50 per cent. of the feldspar albite, 25 per cent. free silica, and about 2.50 per cent. of hydrated calcium oxid. The free silica and lime would combine with the feldspar chemically upon fusion, the whole fused mass becoming a silicate.

No. 3: This is composed in all probability of approximately 64 per cent. of orthoclase feldspar, 33 per cent. of free silica and 3 per cent. of hydrated calcium oxid. (Orthoclase is a potash feldspar.)

In fusion the free silica and lime would chemically combine with the feldspar, making the entire fused mass a silicate high in silica of the composition as given in the certificate of analysis.

No. 4: This as reported consists of a mechanical mixture of caustic alkali (mostly potash) silica, hydrated calcium oxid and tin oxid, which have been fused together and ground up. When these ingredients are fused together they combine chemically and the resultant fused mass becomes a silicate of potash, lime, and tin. In the present state there would be no further chemical action upon the fusion, as it would simply result in a remelting of the already fused material which has been powdered.

It has an approximate composition of 70 per cent. silica, 25 per cent. alkalis, 2 per cent alumina, 2 per cent. lime and 1 per cent. tin oxid, all combined together chemically due to the first fusion as silicates. In all the porcelain samples analyzed, the alkalis alone would make a transparent glass, while the alumina and lime make an opaque-like enamel. According to Brogniart's reports on fusibility of porcelain, the higher the percentage of silica the less fusible is the mixture. The higher the percentage of alkalis the more fusible becomes the mixture. The higher the percentage of lime the more fusible becomes the mixture until the proportion of lime present becomes greater than the silica. When the proportion of lime present is higher than that of the silica, the mixture becomes less fusible.

The alumina, if not present in too large quantities, would make the mixture more fusible than if silica were in its place, but it does not affect the fusibility to any large degree.

It is evident that the metallic oxids, provided they are pure, produce definite colors, and they are used in ceramic art as follows:

Cobalt	oxid..	for all shades of blue
Nickel	" ..	" brown.
Copper	" ..	" green.
Manganese	" ..	" brown and violet.
Iron	" ..	" brown, yellow, or red.
Uranium	" ..	" yellow.
Chromium	" ..	" green or red.

The noble metals, gold, platinum, and the oxid of iridium for red, gray, and black respectively.

Remsen says: "We have learned that there is a close relation between the different kinds of physical change and chemical change, and that one kind of change is capable of producing other kinds. We have learned how to distinguish chemical action from other kinds of action, the loss of their own properties which the substances suffer being a prominent characteristic of chemical action. And, finally, we have learned that the name 'chemical affinity' is given to that which causes substances to act chemically upon one another, but that we do not know what chemical affinity is—we only know what effect it produces."

Discussion.

Dr. L. E. Custer, Dayton, Ohio. This is a subject which is quite in place at this stage of the progress and extensive use of porcelain for inlay and crown work. The second part of the paper spoke of the determination of the fusing-point of porcelain—a very essential thing. We have realized the great difficulty of judging correctly the degree of heat in the high temperature which we are using, and which is necessary in the fusing of porcelain. There have been a great variety of devices placed before the profession. Six or eight were described by me some ten years ago, when I introduced the electric oven. They did not attract very much attention on account of the importance of the electric oven itself, and the profession seemed to have lost sight of these advantages. There are now a number of different devices for the determination of the high heat; that proposed by Dr. Le Cron seems to be the most reliable, except that it may be aided a little by a strong light thrown in the furnace to facilitate the observation of the nugget. It may be obtained by an arc light or the use of the Nernst glower. It will throw a different colored light upon the porcelain which is being fused. If the glower is placed in the top of the oven, as with the Welsbach mantle, we do not have greater heat, but a greater light. So this Nernst glower can be placed in an oven, and by reason of its intense light of different color will throw a strong light on the object which is being fused.

Dr. Le Cron is quite correct in saying that the judgment of the dentist is affected by the surrounding light. If he were fusing a bit of porcelain at noon, and a similar piece at six or eight o'clock in the evening, his sense of judgment would be modified by the difference in the surrounding light. I was surprised —although it must be reasonable—to find such a wide range.

I believe the essayist said there were about 350° of heat difference; and even a person who has become expert will be misled unless he takes into account the time of day at which he is taking his reading.

He spoke of always placing the piece in the same part of the furnace. That is essential in furnaces which do not produce an even heat throughout the oven. One which is wired on all its walls will give an even heat throughout.

An oven which fuses evenly is necessary, not so much because it facilitates determining the degree of heat in the furnace, but for the sake of the porcelain. A piece of large size cannot be fused evenly, even with the ovens on the market today.

Now as to the certainty of this method:

We have had all forms and devices from the most delicate pyrometer to an ordinary thermometer to which the heat is conducted through a platinum wire; yet these are all so susceptible to outside influences that they do not compare with the method which Dr. Le Cron proposed.

We might suppose that this alloy would vaporize, and its fusing-point would change; but we must bear in mind that the nugget simply attains the melting point; it does not remain in a melted condition for any length of time. If you do not lose the pellet, in course of time, even after six months' or a year's use, it will be about the same as it was at first.

Now as to the porcelains themselves. I do not believe we realize that to some extent a chemical action takes place when the porcelain is fused. Put different metals together, melt them up, and you will have an alloy of the different metals. It is more than that when you are melting porcelain. There is to some extent always a slight chemical action going on, so that in the finished product you have not an alloy, if you may call it such, but almost a changed product. That has been my belief as regards the melting of porcelain.

Dr. J. H. London, Washington, D. C. I appreciate very much Dr. Le Cron's method of obtaining the fusing-point of the various bodies, the only objection being that it necessitates looking into the furnace, which of course is injurious to the eyes. In trying to obviate this objection, I tried a soapstone slide into which two small platinum wires had been run, leading from a dry-cell battery connected with a bell. The points of these wires were so arranged that when the alloy (as described) melted, it would run into a hole in the slide, connecting the wires completing the circuit and ringing the bell. This experiment was not successful, but I hope that some of you, who are better electricians than I, will develop this into something useful. Why could not carbon be used at the contact points? The only trouble with my experiment was that the alloy would injure the platinum wires, thereby rendering them useless for the next baking.

Dr. J. P. Corley, Greensboro, Ala. I was very much taken with the clinic this morning which demonstrated the method which the essayist has put before us this afternoon. However, to those of us who have not the privilege of owning an electric furnace, and must confine ourselves to the gasoline apparatus, it is impossible to use this method. The heat comes from the posterior aspect, and if we set the soapstone receptacle between the end of the muffle and the piece we are fusing, the soapstone receptacle will certainly become hot before the temperature in the furnace attains an equal degree of heat, and there is not room for the piece and the soapstone receptacle to set side by side. Therefore I do not see how we could get the same temperature on the two pieces at the same time.

Dr. Le Cron. I never used the gasoline furnace, but I think the heat would be uniform. If it were, it could be used with a soapstone crucible, as well as the electric.

Dr. London. It occurs to me that if you use a piece of soapstone to carry your piece in, and put it at an equal distance from the side—for instance, if your porcelain filling should be on this side, and your piece of metal on that side [illustrating]—the heat would fuse both at the same time.

Dr. Custer. The point is this: wher-

ever you put your porcelain once, put it again. Have one place for the porcelain, and another for your testing appliance. If it heats differently in different parts, two or three experiments will show you the result.

The paper by Dr. BURTON LEE THORPE, St. Louis, Mo., entitled "A Brief Review of the Prominent Pioneer Manipulators of Gold Foil," read in Section I, is here transferred to its proper section—Section II. The paper was as follows:

A Brief Review of the Prominent Pioneer Manipulators of Gold Foil.

By BURTON LEE THORPE.

MUCH of interest might be said of the expert operators of the past. This paper and these photographs are presented to keep afresh in our memory the great good these men have done for the profession, and that we may meet them "face to face."

Carlyle has aptly said that "The history of the world is the biography of great men," and so the history of dentistry is the biography of great men in our profession, who by their genius and versatility have placed our calling where it is today. The time allotted is too short for us to have more than a passing glance at the work of each of these men. Many who were equally skilful have intentionally been omitted.

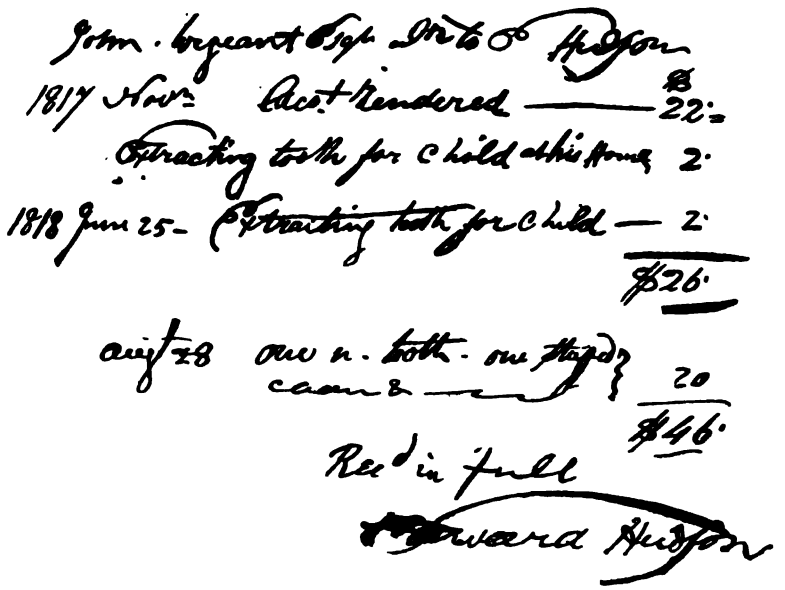
Edward Hudson of Philadelphia was a remarkably picturesque character of artistic and musical temperament, and one of the most skilful gold operators of early times. He was born in Ireland, October 1772, and studied dentistry with an uncle, who educated him at Trinity College, Dublin, where he had as classmates Robert Emmet the patriot, Thomas Moore the poet, and Arthur O'Connor. Here Hudson gained a reputation as debater and writer and was active in Irish politics. He was drawn into the "Emmet conspiracy," and was soon afterward arrested and placed in Kilmainham jail, where he was confined until 1802. During his imprisonment he was allowed to

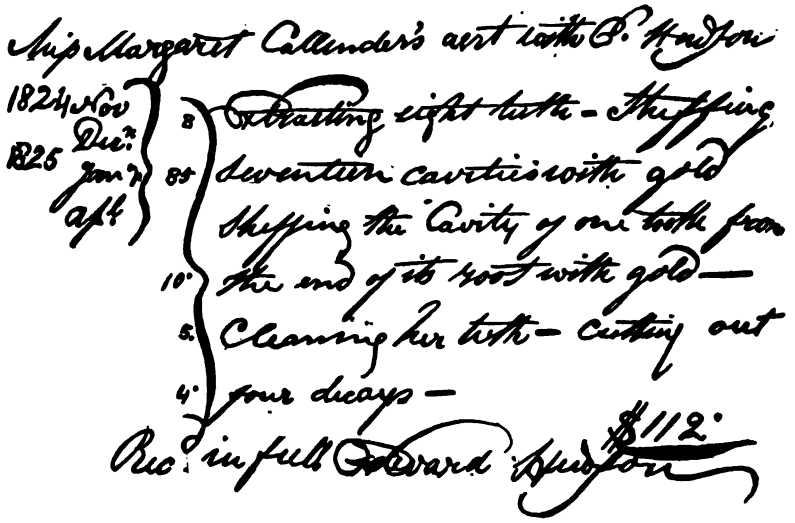
EDWARD HUDSON,
Philadelphia, Pa.

practice his profession for the nobility and gentry of the country, who paid him excellent fees for his skill. After four years of confinement he was released, and immediately embarked for America, arriving in Philadelphia about 1803, where he soon became one of the recog-

nized leaders of the profession. At this time nothing but non-cohesive gold was used.

dered by him in 1817, in which he makes a charge of twenty dollars "for one stuffed canal." The next picture shown


John Bogaert Esq. Dr to P. Hudson
1817 Nov. Acct. Rendered — $22.
Extracting tooth for child at his home 2.
1818 Jun 25 — Extracting tooth for child — 2.
$26.
aug 28 one u. tooth - one stopped canal — 20
$46.
Rec'd in full
Edward Hudson


Mrs Margaret Callender's acct with P. Hudson
1824 Nov 8 Extracting eight teeth - stuffing
1825 Jan 7 Dr. 85 seventeen cavities with gold
aft 10 stuffing the cavity of one tooth from the end of its root with gold —
5 Cleaning her teeth — cutting out
4 four decays —
$112.
Rec. in full Edward Hudson

Hudson is probably one of the first to have filled root-canals with gold foil. I here show a facsimile of a bill ren-

is a facsimile of a bill rendered by him in 1824, in which he makes a charge for "filling the cavity of one tooth from the

end of its root with gold." It is known that his work was far above the average of his time, and he is reported as being one of the most highly skilled operators of his day. He was of poetic nature and was an excellent performer on the flute. Thomas Moore pays eloquent tribute to his musical attainments in the preface to his poetical works, where he says: "A young friend of our family, Edward Hudson, a nephew of the dentist of that name, who played with much taste and feeling the flute, and who, unluckily for himself, was but too deeply warmed with the patriotic ardor then kindled around him, was the first who made known to me this rich mine of our country's melodies —a mine from the working of which my humble labors as a poet have since derived their sole luster and value."

During his confinement in prison, Hudson drew upon the wall of his cell a charcoal portrait designed to illustrate a crisis in the story of St. Cecilia. Thomas Moore says that when he saw this drawing it suggested to him the theme of his poem, "The Origin of the Harp."

Horace H. Hayden of Baltimore has the credit of being the "strong man" and the "power behind the throne" in organizing dentistry from a trade into a truly scientific profession. It was Hayden who furnished the gray matter. An entire evening could be spent in reviewing his achievements and the great work he did for dentistry, for which he may truly be entitled to be denominated the father of American dental science. He was born to be a leader, and was raised during the stirring times of the revolution. As a boy he was a naturalist; soon to become proficient in the study of the ancient languages. Next a cabin-boy on two voyages to the West Indies. At the age of sixteen he learned the trade of his father, who was a carpenter and an architect. Later on he became a school teacher, and at the age of twenty-four was a patient of Mr. John Greenwood, a skilful dentist of New York city, who afterward acquired fame as the dentist to General Washington. Through Greenwood's encouragement young Hayden studied dentistry, and after traveling for a while as

HORACE H. HAYDEN,
Baltimore, Md.

itinerant dentist he located at Baltimore, where he soon obtained proficiency as an operator, excelling especially in the manipulation of soft gold foil. He gained the confidence of the medical profession; recognizing his ability, they indorsed him for the honorary degree of doctor of medicine, which was conferred on him both by the Jefferson College of Medicine of Philadelphia, and the University of Maryland in 1837. In 1825 he delivered a course of lectures on dental surgery to the medical class of the University of Maryland, being the first to deliver such

a course in the United States. He was the leader in organizing the *American Journal of Dental Science,* the Baltimore College of Dental Surgery, and the American Society of Dental Surgeons. As a writer on medical, dental, physiological, and pathological subjects he was very prominent. Early geological science was also indebted to him for a four-hundred-page contribution, entitled "Geological Essays," which he published

CHAPIN A. HARRIS,
Baltimore, Md.

in 1821. He was also a talented botanist, and wrote on kindred subjects. Hayden was a real Moses, who led the profession to the promised land of education, ethics, and scientific attainments. We may safely call him the father of American dental surgery.

Chapin Aaron Harris of Baltimore. None can question that Harris and Hayden were the saviors of American dentistry. They divorced it from empiricism and married it to science, by organizing the first dental college, the first dental journal, and the first dental society in the history of our profession.

Harris was a talented man of much energy, and a firm believer that "The empiric makes of all things a secret, but the artist gives publicity to his useful inventions." Harris was a skilful manipulator of non-cohesive foil; some present in this room are living witnesses to the fact. They have seen his operations and possibly some have seen him operate. His contributions to our literature, such as "Dental Art: a Practical Treatise of Dental Surgery," first issued in 1839, now revised and known as "Harris' Principles and Practice of Dentistry." His long connection—as the leading spirit—with the Baltimore College of Dental Surgery, and his services as editor of the *American Journal of Dental Science* during a period of twenty years, will make his name ever remembered as long as the pages of dental history are read. His sacrifice of time, money, and health for the advancement of his profession, and his untiring efforts in behalf of the journal, college, and society, made him a martyr to the profession he so greatly honored.

Elisha Townsend of Philadelphia, a contemporary of Harris, was the son of Quaker parents, a watchmaker by trade, and also an actor. He studied dentistry at the age of twenty-eight, and became a most skilful operator, his manipulations having all been of a high order of mechanical excellence. He filled root-canals with gold exclusively, in a most perfect manner. He was accustomed to place his gold for immediate use, on a china plate in the oven of the kitchen range over night, claiming that it worked better. He was considered by his contemporaries a very able dentist. Some

of his fillings, inserted fifty years ago, are today as perfect as the day they were inserted. He was instrumental in bringing about the change from the large-handled, clumsy instruments to smaller ones better adapted for delicate work. He also advocated the use of the watchmaker's eyeglass, contending that it aided in securing exactness and materially preserved the operator's sight.

He was an "all-gold" advocate, and for a time was interested in amalgam, which

ELISHA TOWNSEND,
Philadelphia, Pa.

was then in the market under the trade name of "Townsend's amalgam." After experimenting with this filling material he went back to gold.

Joshua Tucker of Boston was a talented member of the profession, an expert teacher of penmanship, a school teacher in his early career, and one of the most expert manipulators of non-cohesive gold. He also manufactured porcelain teeth as early as 1833. It is hard to realize in this day the difficult operations that could be performed in those days with non-cohesive gold foil, used in cylinders and pear-shaped pellets.

JOSHUA TUCKER,
Boston, Mass.

John Skinner Clark was an early pioneer of St. Louis, but afterward removed

JOHN S. CLARK,
New Orleans, La.

to New Orleans, where he was prominent as a practitioner, as editor of the *Dental Obturator,* and lastly as organizer and

first dean of the New Orleans Dental College. Dr. Clark wrought wonders with non-cohesive gold foil. He cut the gold into strips, folded the strip with small tweezers, reduced the length of the folded strip by manipulation, shaped it into a cylindrical form, and by holding it in the palm of his left hand, rolled it back and forth until it became thoroughly condensed like a gold wire the size of a knitting needle. These cylinders were cut into smaller ones of different lengths with strong scissors, and were placed in the cavity and condensed laterally. Other cylinders were introduced in the center to fill the place from which the wedge-like instruments had been removed. It is claimed that he was the originator of the process of rolling cylinders around a broach. This method was first described in the *Dental News Letter* —see page 13 of the issue for October 1856.

Dr. Clark, who was recognized as one of the skilled operators of our country, was also a talented man in other walks of life.

Robert Arthur of Baltimore was the first to make known the cohesive properties of gold. This will remain his enduring monument in dentistry. He is also famous as having been the first to receive the degree of doctor of dental surgery, granted to him by the Baltimore College of Dental Surgery. He was a diligent student as a youth and obtained a good classical education, which included Greek, Latin, French, and German. At an early age, thrown upon his own resources, he was apprenticed as a "printer's devil." Later he became acquainted with Chapin A. Harris, who induced him to study dentistry, and he entered the first class of the Baltimore College of Dental Surgery, and with his only classmate, Dr. R. Covington Mackall, constituted the first graduating class —March 9, 1841. Arthur began practice in Baltimore, and later went to Washington, then to Philadelphia, where he filled the offices of dean and professor of the principles and practice of dental surgery in the Philadelphia College of Dental Surgery, which he assisted in organizing.

ROBERT ARTHUR,
Baltimore, Md.

He made frequent literary contributions to the profession. His best literary work was "The Treatment and Prevention of Decay of the Teeth: a Practical and Popular Treatise" (Philadelphia 1871). In this work he advocated his system of separating teeth for prophylactic purposes—commonly called "Arthurizing."

Arthur is credited with being the first to discover the cohesive properties of gold by annealing. This occurred in Philadelphia, and Dr. Louis Jack first called his attention to this circumstance. In 1857 Dr. Arthur wrote his "Treatise on the Use of Adhesive Foil," in which he

presented to the profession the principle of welding the annealed gold by means of serrated pointed instruments. As a teacher and writer, Arthur occupied an important place in the profession.

A year after Dr. Arthur had called the attention of the profession to the cohesive properties of gold, a young man began the study of dentistry with his uncle, Dr. Joseph Clowes, of New York. He developed skill in both operative and prosthetic work, and early earned for himself an enviable reputation. The early dentists were adepts in the use of napkins, by this method keeping the saliva from coming in contact with the cavity and filling material. In 1862 this young man, *Sanford Christie Barnum* of New York, conceived the idea that made practical the use of the rubber dam in dental operations, which discovery he generously gave to the profession, and made himself known as the profession's benefactor, also making it possible "to govern the tide and command it to go hence, that we may approach the wreck on the beach and repair the breaks in the hull, that the ship may continue to sail on its mission of usefulness."

SANFORD C. BARNUM,
New York, N. Y.

ROYAL W. VARNEY,
New York, N. Y.

Royal William Varney of New York was a student of Atkinson, and later on of Corydon Palmer. Varney developed marvelous skill as an operator, and had few equals, probably no superior, in the manipulation of heavy gold foil, with which he built magnificent monuments to his skill. He was a natural mechanic, and designed a set of instruments for packing gold, known as the "Varney pluggers," which are in demand to this day. He was an earnest investigator with the microscope, had a musical taste, and was an able performer upon the violin.

Walter Webb Allport of Chicago was another of those wonderful operators whose fillings had contour, finish, and lasting properties. Allport was a student of Amos Wescott, an excellent den-

tist of the early days. He located at Chicago in 1855. He was an enthusi-

W. W. ALLPORT,
Chicago, Ill.

astic microscopical investigator, and instrumental in organizing the Chicago Mi-

W. H. ATKINSON,
New York, N. Y.

croscopical Club. He was editor of the *People's Dental Journal* and organizer and promoter of many dental societies.

William H. Atkinson of New York, familiarly called the "Grand Old Man," another microscopical investigator, was an early authority on dental therapeutics, pathology, and histology. Through his efforts the first school of microscopy was established in New York, under the management of Professor Carl Heitzman. Atkinson was one of the finished operators of his day, his fillings ranking with the best.

Henry J. McKellops of St. Louis was a man whom all respected for his supe-

HENRY J. MCKELLOPS,
St. Louis, Mo.

riority as an operator. He had few if any equals when it came to the manipulation of heavy foil, especially gold-platinum foil, with which he wrought wonders. Only those who have seen McKellops' operations doing good service thirty or forty years after their insertion can appreciate just what he did for operative dentistry.

Marshall Hickman Webb of Lancaster, Pa., was a boy genius in carving violin-bodies and in the manufacture of mechanical toys and water-wheels, and also an assiduous student in dental pathology and histology. He soon became an expert in dental operations and attempted to fill all classes of cavities with cohesive gold, no matter how difficult and inaccessible they were. He was an inventive genius rarely equalled, and his improvements of the Bonwill electric mallet gave him professional prominence, and the fillings he built of cohesive gold reached the highest excellence.

MARSHALL H. WEBB,
Lancaster, Pa.

Contour was his watchword, and as a clinician he had few if any equals. In the preface to his excellent book, "Notes on Operative Dentistry," the keynote of which is cohesive gold, he beautifully expresses his ideals when he says: "In literature, sculpture, painting, and music, and in operations such as dentists ought to perform, it is not the aim of a Dryden, a Michael Angelo, a Raphael, a Beethoven, or a Varney to write, carve, paint, bring forth a 'concord of sweet sounds,' or to produce in gold that which requires but little time and skill, and is simply cheap and inartistic; it is the endeavor of the *artist,* whatever be the sphere of his efforts, to produce the perfect and the beautiful."

William Henry Morgan of Nashville was born in 1818, in Kentucky, of revolutionary stock, and was graduated March 1848 from the Baltimore College of Dental Surgery. A year afterward he located in Nashville, Tenn., where he soon acquired a lucrative practice and rapidly attained high rank in American dentistry. He was an enthusiastic dental society attendant, and twice filled the office of president of the American Dental Association.

WM. H. MORGAN,
Nashville, Tenn.

He was an acknowledged leader of the profession in the South, and was chief organizer (in 1879) and first official head of the Dental Department of Vanderbilt University. He was a talented

speaker, and was one of the expert manipulators of gold foil in this country.

William Henry Dwinelle of New York was a talented dentist, an inventor, an expert wood-engraver and draftsman, and was an associate with Chapin A. Harris in 1847-49, in editing the *American Journal of Dental Science.* He was another devotee of the microscope. Dr.

WM. H. DWINELLE,
New York, N. Y.

Dwinelle was a pronounced advocate of cohesive gold and of the contouring of fillings. For originality he was in the same class with Bonwill. He was a great reader, an amateur in the fine arts, and one of the brilliant men of early dentistry.

Jonathan Taft of Ohio was a man whom all loved and respected for his mildness of manners, his skill as an operator, and his knowledge of our science. Dr. Taft's face is missed in these annual meetings, where he was a familiar figure, but his work as a teacher, writer, and clinician will live as long as the pages of dental history are read.

JONATHAN TAFT,
Ann Arbor, Mich.

Corydon Palmer of Ohio is perhaps the oldest practicing dentist in the

CORYDON PALMER,
Warren, Ohio.

world. He was born in 1820 and for many years has been prominent in dental

society work and as a skilful operator. He was in the same class with the men whose pictures have been shown, and of him Dr. Allport said: "Palmer was the best filler of teeth in the world." He was present last year at the congress at St. Louis and received much attention on account of his skill and his long service in the profession. His presence at this annual meeting is an encouragement to the younger men, and a source of gratification to his many old friends.

The last picture is that of *Greene Vardiman Black* of Chicago, who without

G. V. BLACK,
Chicago, Ill.

doubt has done more to develop dentistry as a whole than any other one living man. His contributions to operative dentistry, comparative dental anatomy, histology, bacteriology, pathology, and in fact to our whole science, make him the best-known and best-respected dental authority that America—yes, the whole world—has ever produced.

There are many other talented men whose likenesses I might show, but time will not permit. These are some of the men who have given our profession caste, and who, through their versatility and skill, have materially contributed to the profession.

George D. Prentice says: "There is only one stimulant that never intoxicates—duty. Duty puts a clear sky over every man, in which the skylark of happiness always goes singing."

Our pioneers did their duty, as they saw it, to humanity and their profession, and have left their names indelibly written on the pages of the history of dentistry.

Discussion.

Dr. E. T. Darby, Philadelphia, Pa. The paper is not one for discussion, but it gives me great pleasure to say something of these men whose faces have appeared upon the screen. As yet I am not an octogenarian, but strange as it may seem, I was personally acquainted with all of those whose faces you have seen, with the exception of four. Some of them I have known very intimately. The original of the first picture, Edward Hudson, I have known well by reputation, because I have patients who were patients of his when he was in Philadelphia, as early as 1826. I have now in my practice one lady ninety years old who was a patient of Hudson's and an intimate friend of his family. She was in school in Philadelphia as early as 1824 or 1826. At the present time she continues her intimacy with the two daughters of Dr. Hudson, who are now living, and women of advanced age. I have watched for a good many years one tooth in this lady's mouth which has a filling

inserted by Hudson. I suggested to her that if she lost that tooth I hoped she would give it to me. In consequence of her advanced age and resorption of the alveolar process, the tooth became loose and came out, and I now have it in my possession. Dr. Hudson, as Dr. Thorpe says, was a man of unusual ability, and commanded the respect of all who knew him. Exiled from his own country, he came to Philadelphia and established himself in some mercantile business. He failed in his business ventures in Philadelphia, and at the closing up of his affairs was heavily in debt. He then returned to his profession and soon attained a large and lucrative practice. It is said that although his creditors settled with him for twenty-five cents on the dollar, he paid the balance of seventy-five cents after he had acquired a practice and was able to do so, and at his death he had the respect and esteem of all who knew him. He died in Philadelphia after a period of fifteen or twenty years of practice, and was mourned by a large circle of friends.

The next portrait was that of Horace H. Hayden. I did not know him personally. He was a man of strong character, and did much to elevate the profession in its earlier history.

If you recall the faces which have been thrown upon the screen tonight, I think you will agree with me that it was a remarkable exhibit of fine faces of men of strong character; they were all strong characters—men who would have been an honor to any profession. The work which these men did would compare favorably with the work done by the profession today. They worked with inadequate facilities, but they worked well, and their operations of twenty, forty, and sixty years ago can be seen today, and many of us would be proud to claim them as our own.

Dr. Elisha Townsend of Philadelphia was a Quaker by birth, and a man of strong moral and intellectual attainments. He was passionately fond of good horses. His patients have related to me how he would leave his chair to go into the street to examine a horse which someone had brought for him to purchase. He received in those early days—forty and fifty years ago—fees that many of us would be glad to receive today, and the work he did has lasted through all these years. I could show you fillings that he made fifty years ago. In early life he was a watchmaker by trade, but later turned his attention to dentistry.

As I said at the beginning, there is very little to discuss in the paper, but I listened to it with great pleasure, and I am sure that all present will join me in offering thanks to Dr. Thorpe for this valuable contribution.

Dr. CHARLES MCMANUS, Hartford, Conn. As Dr. Darby said, there is really nothing to discuss in the paper; it is simply to enjoy. I certainly have had much pleasure in seeing the portraits and listening to the very eloquent address of Dr. Thorpe. I would like to say that perhaps those not engaged in this work hardly realize the amount of labor, trouble, expense, bother, and all sorts of worries Dr. Thorpe has been to in order to get the pictures he has shown tonight. I am particularly pleased with this paper as chairman of the Committee on History, and I think it will create an interest in the history that we are to bring out in the near future under the auspices of the association.

Dr. THORPE (closing the discussion). I appreciate the reception of the paper very much, and I am proud to know that

the National Dental Association is so appreciative of the men who did so much for our profession.

I am glad to know how enthusiastic we are regarding the subject. The Committee on History are in possession of the manuscript of a very excellent work on ancient history, by Dr. Vincenzo Guerini of Naples, Italy, who is an authority on ancient dentistry in Europe, and they are to present a proposition to the association by which this work will be published and made accessible to the profession. It is an opportunity for the association to get something that we have been wanting for years. It is a lamentable fact that there has never been a book of this kind published on the history of our profession. In the past only scattered fragments, gathered here and there, have been published, and I want to ask every member of this association who cares for his profession's history, to vote for the resolution which the Committee on History will have to offer tomorrow. We will then have a valuable authentic history of ancient history down to the time of Harris and Hayden, the fruit of the labors of a noted historian—Dr. Guerini.

There being no further business before the section, Dr. Butler announced its adjournment *sine die*.

SECTION III.

Oral Surgery, Anatomy, Physiology, Histology, Pathology, Etiology, Hygiene, Prophylaxis, Materia Medica, and Allied Subjects.

Chairman—J. D. PATTERSON, Kansas City, Mo.
Secretary—W. H. G. LOGAN, Chicago, Ill.

FIRST DAY—Tuesday, July 25th.

THE first meeting of Section III was called to order at 2.30 P.M., Tuesday afternoon, July 25th, by the chairman, Dr. J. D. Patterson, Kansas City, Mo.

A paper was read by Dr. L. C. TAYLOR, Hartford, Conn., on "Some Modern Thoughts Along the Line of Oral Hygiene," as follows:

Some Modern Thoughts Along the Line of Oral Hygiene.

By LEVI C. TAYLOR.

HYGIENE, we are told, is "that branch of sanitary science which pertains to the preservation of health."

As we review the teachings of some of the ancient practitioners to ascertain their conception of oral hygiene, we seem to find little of value outside the simple cleaning of teeth. In fact, how could it be otherwise?—for the limited knowledge of all was confined to the extracting of teeth, and mechanics—a condition far too prevalent today, as the numerous gilded mouths of those we meet in our daily intercourse testify.

Among the later practitioners, Dr. John M. Riggs in 1866-68 demonstrated his methods of treating "scurvy of the gums"—as it was then called. In the early seventies Dr. Riggs renamed it "disease of the gums." Some of our

more fastidious friends have chosen to call it pyorrhea, a term very common and much abused at the present time.

That dental education has made great progress no one will deny. The late Dr. Noble once told me there was not a graduate in his class who possessed the requirements to enter the poorest dental college of the present day. It is the case in this as in other fields, that the broader education opens up new avenues, and each decade the field broadens.

There is a portion of the human mouth which is conscientiously shunned by the rhinologist, he believing it to belong to the dental profession. Are we as dentists caring for those soft tissues, keeping them healthy and vigorous to the full extent, resulting in the health of our patient? Let each one answer.

One of the great drawbacks to progress is in the misunderstanding among ourselves. We use a term to convey a certain meaning, but we soon find others using the same term to convey an entirely different one. For instance, we speak of *prophylaxis* as meaning a surgical or manipulative treatment for the preservation of health, and *prophylactic* as meaning a therapeutic treatment for the preservation of health. Others use these terms alternately as though they meant one and the same thing, and in the next sentence that we find they will speak of cleansing teeth.

The term *cleanse* is defined "to purify and make clean," which in the broad sense has a slight meaning under the head of oral hygiene, but our dictionaries give us a synopsis to indicate that it is intended to be used as a religious term—*i.e.* "To walk in the light" of Jesus Christ, whose blood "cleanseth from all sin." Now, would it not be better, and make us stronger in our position, to leave this term to our religious friends, and confine ourselves to "prophylaxis," which has a much deeper meaning than the simple term "cleanse." Prophylaxis embodies the principle of cleaning the mouth generally, and it also embodies the principle of stirring up the pericemental tissues to renewed vigor, making them hard and able to endure the most rigorous manipulation.

The uncivilized man who eats raw foods uses his mouth as a mill to grind and prepare them, and as he forces his teeth into these hard and rough substances the tissues are used with a vigor that civilized life seldom encounters; and even when it does we shrink from the task, complaining that "it hurts, the gums are tender," etc.

My experience has been that as long as we leave the mouth in this tender condition, decay of the teeth predominates to an alarming extent. Our patient, often half sick, is not aware of the cause of his condition. In many instances dyspepsia appears and much pain is caused the patient while digesting the food. In young people the trouble begins in a nervous debility which if allowed to continue will result in what our medical friends call nervous prostration. In other instances general depression will follow, which finally results in rheumatic difficulties. These are some of the more common ailments developing from mouth-conditions, but there are also multitudes of others. That a large percentage of these ailments of the human family can be cured by proper manipulation of the mouth there is not the slightest doubt.

When some of our dental friends inform their patients that their teeth are bad because of a bad stomach, we beg leave to differ with them. The stomach is bad because of the faulty condition of

the mouth, which may be due to personal neglect or faulty handling of the mouth or faulty teaching on the part of the practitioner. We are, as dentists, teachers, and are supposed by the public to be familiar with cause and effect.

Can this nervousness be cured? I will answer, Yes, in most instances it can be cured by proper care of the mouth. "White decay" in the mouth is a most dangerous factor to health, leading up to nervousness. Can white decay be controlled? Yes; but not with the usual methods employed, as the use of gold and amalgam fillings. That a large percentage of the dental profession continue to attempt to save these soft teeth by the use of gold is surely lamentable to us as we view the numerous wrecks brought to our daily notice.

We seem to find only two of the materials used that accomplish the saving results so much desired. Gutta-percha has proved a saver of teeth, but it becomes dirty and objectionable, and it is practically abandoned as a filling material. Phosphate cement has come to be recognized as a most valuable preserver of tooth-substance. The choice of a material for the protection of our cement seems to lie between gold, porcelain, and amalgam, all of which have their places. As porcelain cannot be adjusted without much cutting and mutilating of the tooth it may be said to be limited to labial cavities, and even then, with the exception of color, gold can be adjusted so much better that it is preferable, and in all approximal cavities where it is possible to make a gold filling, the combining of a cement lining, thereby making it a hygienic filling, is many times more valuable than the metal in contact with tooth-substance. To me the day is fast passing when first-class care of the mouth can be ascribed to him who lingers in the ancient custom of placing gold in contact with the tooth.

What is this proper handling? First, restore every tooth to as near its proper form as possible by excavating to solid walls—notice that I do not say healthy, for the reason that the tooth-substance is rarely free from irritation of the tubuli when decay is progressing rapidly, consequently it is not proper to call it healthy as long as there is inflammation. Having cut to solid walls, we proceed to fill, using cement in contact with the tooth—metal is too good a conductor of thermal change and too poor a tooth-saver to be allowed in conjunction with tooth-substance. After placing a cement we proceed to protect it by the use of such metal as will best suit the case, always building into the cement while soft. After filling each tooth to its full size, we then proceed to stimulate the pericemental tissues by the use of sticks and pumice, for engine work in such cases is out of the question; I never have seen the better results obtained thereby—and, as far as I know, everyone who has attained a considerable degree of proficiency in prophylaxis has come to the same conclusion.

Of late we have been confronted with the theory that it is of great importance to "blow out" the pumice after going over the mouth. I do not care to take any issue with friends on this point, for it surely will do no harm, but it is a question if it does much good. I think our colleagues would be serving their patients better if they would devote the time to a vigorous use of the stick. We are too much inclined to want to get over this service easily.

There has recently been considerable talk by many concerning the importance of chewing our food. That thorough mastication is an important factor I sin-

cerely believe, but we must have conditions of health in the mouth at the start, or we shall find we have poisoned the food to such an extent that it will be a serious drawback. In all phases of dental service of any value their is a leading back to first causes. After we have removed this mouth-infection I will join heartily in the importance of properly masticating our food. It is a plain duty on our part to first put the mouth in a good hygienic condition; then it is time to begin to talk of the proper use of the mouth. As we do this we shall soon see our patient returning to health, with sparkling eyes and glowing, rosy cheeks. What would you think of the engineer who, finding the water supply was being polluted from the streams running into it, should try to cleanse by injecting the reservoir? Would you not prefer to go back to the source of the trouble? We are not referring to the organic diseases of the stomach (which must be treated as such), but to those polluted in flowing streams.

Dr. Soulen remarks, in the *Dental Digest* for May 1905, that "One of the chief duties of the dentist is to remedy the ravages of dental decay and to use all possible means of averting it." The above is sound doctrine and worthy of full recognition, although I can hardly place as much value upon the use of syrup of hypophosphates of lime as he does in his article. He makes a splendid statement a little later in his paper when he says, "The most essential agent in the preservation of the teeth is cleanliness, for so great are the powers of the factors of decay that, unless kept clean and aseptic, the best of teeth will be likely to fall a prey to caries." While the above is excellent as far as it goes, he seems to overlook an equally valuable part in the care of the mouth, *i.e.* the stirring up of the pericemental tissues so often referred to by our friend Dr. D. D. Smith. In an article, Dr. Smith speaks of "Hypersensitive Dentin." Hypersensitiveness of dentin is the result of pericemental irritation far more than of pulp-irritation. The pericemental life of the tooth is markedly influenced by the irritative infection found always at the necks of untreated teeth. Removal of this infection is the removal of much of the cause of undue sensitiveness of dental tissue.

I consider this a most valuable statement, and my own demonstrations have for many years proved it to be true. I believe we should give our attention more in the latter direction, and it is here that so many stumble when thinking they can do this work with the dental engine. When those who have shown their ability along this line inform their friends of the impossibility of obtaining these results with the engine, there is at once an inclination to distrust the motives; but, as far as I am aware, all who have attained a leading degree of efficiency have come to the same conclusion.

It is not my intention to go into a detailed account of the multitudes of therapeutic remedies used in the treatment of septic teeth. Many of them have some value, but the more important factor in the treatment of septic teeth is the removal of all infected matter, when Dame Nature will care for the rest. This same principle when carried to perfection is what brings such beautiful results from the general care of the mouth.

Many practitioners are advocating this and that preparation without the slightest knowledge of why they do so, except that they have been told by some commercial men that if they thoroughly prepared a tooth and used their wash they would obtain such-and-such results.

Stimulated by the instructions given, they proceed to try it, and results come. Had they been as faithful in the extirpation of septic material and left the colored water in the bottle they would have had equally good results.

When we are confronted by a deep pus pocket by the side of a tooth we work perhaps many hours and then find we have left just enough foreign substance on the tooth to produce pus. Discouraged and disheartened by failure, we are wont to try some chemical dissolvent—which we have found in aromatic sulfuric acid. While it is a very unpleasant remedy to use, it seems to reach the desired end, and has been victorious in producing a healthy tissue when we failed to quite reach every point of deposit or necrosis.

The continued use of many of the preparations so vigorously pushed, or of the peroxids, will cause the enamel of the tooth to grow pitted and rough, while a similar use of phénol-sodique (which is both antiseptic and germicidal) will stimulate the enamel to a hardening with a bright and glossy surface which we see only in cases treated by the said stimulant.

The one thing most needed today is not therapeutics, but more faithfulness in obtaining results by the commonsense methods of surgically dethroning decay and all irritating or septic matter in the human mouth.

Discussion.

Dr. J. Y. Crawford, Nashville, Tenn. I did not hear all of the paper, but was much entertained by what I did hear. I can concur in much that was said, but one little point I would like to controvert, because I think it mistaken. The doctor suggested that the sensitiveness of the dentin was probably more frequently due to disturbance of the pericemental structures than of the pulp itself. I believe that to be so markedly wrong that it will injure the value of the contribution. The truth is, that we have been laboring under a mistaken idea about the sensitiveness of the dentin. I firmly believe that every human tooth that is abnormally sensitive to cutting indicates some type of abnormality. Perfectly normal human dentin in a normal person should not be abnormally sensitive to cutting. Dr. Andrews has said it should not be more painful to cut in one direction than in another. As to the etiology of dentinal irritability, I am inclined to believe it originates in one of three or four ways. I believe it is sometimes trauma—teeth that are now non-sensitive can thus in a few months be made painfully sensitive. I believe that some dentin, from the effects of sepsis, may become painfully sensitive to cutting; that owing to nervous irritability it will be changed from a normal physiological condition to one that is pathological and painful. I believe that if a full comprehension of this truth were grasped and acted upon by the dental surgeon it would be a factor in his uplifting. As for the hypersensitiveness of the dentin depending upon pericemental irritation, with the modern means of anesthetizing the tooth—even the most hypersensitive—under great pressure, we can anesthetize and surgically remove the entire pulp tissue without pain. I believe it is through the medium of the pulp that the dentin is made hypersensitive and diseased. I am glad to have heard the paper, and to have had this point brought out.

Those who have hypersensitive dentin have decayed teeth, and the sensitiveness

is pathological. I believe that in the decay of the teeth there is a nervous phenomenon that has not been observed and classified. The variable degree of sensitiveness—from non-sensitiveness to hypersensitiveness—indicates that it is not the normal condition.

Dr. N. S. Hoff, Ann Arbor, Mich. While I do not care to disagree scientifically with the last speaker, I hardly see how we can always think of a condition of decay of the dentin as being responsible for sensitiveness of the teeth. The sensitiveness of the tooth does not come from the dentin. The pulp is the center of sensitivity, and it is only by its irritation, whether it be from decay, or mechanical and chemical irritation, that the irritation is experienced. I think Dr. Taylor has rightly concluded that it is irritation of the pericemental tissue, because that is a more common source of irritation than is caries. We frequently have dental caries present in the mouth, but we have also more frequently irritability of the gum tissue and the peridental membrane, and reflexly the pulp must be irritated. The theme of the paper is just now very popular, and it is deservedly so. There has no method of practice come into such popularity in our profession for years, nor none that promises so much for the uplifting of the practice of dentistry as does this question of prophylaxis. I remember that several years ago Dr. Crawford made the statement that there were not dentists enough in practice to keep clean the people's teeth. In my judgment there are not half enough even now to do so. If we should all give this matter the same attention as do such men as Dr. Smith and Dr. Taylor, we should have much less reparative dentistry to do. We could keep busy every man now practicing dentistry, with profitable advantage to the public, and if they would do this, even to the neglect of other work, I do not believe the people would suffer more than they now do from the ravages of decay. I believe the question of susceptibility and sensitivity of the dentin can be almost entirely obliterated by the application of prophylaxis to the teeth.

The question of the use of proper filling materials is an important prophylactic measure. The essayist did not emphasize this as much as he should. I believe the use of porcelain for filling teeth, or of other materials with which they can be properly contoured and replaced in their normal condition, with prophylaxis, promises more benefit to the public than anything that has ever come before the profession. We all rejoice in the investigations of our scientists as to the cause of tooth-decay, etc., but in my judgment it is not to be compared with this question of the proper care of the teeth.

Dr. A. W. Harlan, New York, N. Y. I was unfortunate in not being able to hear all of Dr. Taylor's paper, but I judge the trend of it was with reference to the conservation of the teeth through the prevention of caries, etc. I have had occasion during the past several months to spend considerable time investigating the habits of man with reference to the choice of his food and the use of it, and it seems to me we must pay more attention to the use of the teeth in maintaining the mouth in a state of health. If the foods we eat are soft, semi-liquid, and liquid, and are swallowed without mastication, necessarily, after a time, the stomach refuses to perform its functions, and we have a train of intestinal disorders which are reflected in the mouth and

ultimately affect the teeth. Therefore, in addition to the means of removing all kinds of external concretions from the teeth, we must insist upon a proper mastication and upon a reasonably mixed diet, so that the teeth shall have that degree of exercise that will tend to promote the best general nutrition of the whole body.

Dr. J. P. CORLEY, Greensboro, Ala. Unfortunately, I did not hear all of Dr. Taylor's paper, but what I did hear interested me very much, for oral hygiene has always been my hobby. I think the essayist struck the keynote when he said that primeval man kept his mouth clean, his teeth well exercised, and permitted the wholesome development of the mouth, maxillary bones, and muscles of mastication; in the grinding process not only cleansing his teeth and massaging the gums, but attaining a wholesome, healthful condition of the oral cavity. In regard to this new phase of prophylaxis, which has been specialized into a technical vocation, I must say that I am not in sympathy with it. If we do the scrubbing which the patient should do for himself, we not only humiliate ourselves in a professional sense, but rob the patient of the practice and the technique which would enable him to do the work himself. He could do it once or twice a day and maintain a clean condition; but if we have him come to us once or twice a month he will not undertake it himself. I take the position that after the accretions have been removed any intelligent person can more perfectly cleanse the mouth himself than can an operator, and if he is properly impressed with the necessity for it, he will do it, and keep it done, instead of waiting until he goes to a dentist to clean off the teeth. It is discouraging to hear such representative men as some we have in our profession preaching this doctrine of the dentist doing what the patient can do for himself. We have the disadvantage that for several generations we have been munching and swallowing soft food, so that there has been an atrophy of the muscles of mastication and a contraction of the arch, which has practically put the human denture out of commission. We should begin preaching a reformation in the cuisine, and make a demand that we have a *régime* that will permit us to clean our own teeth and return to natural methods.

Dr. HOFF. I do not believe the gentleman who has just spoken has ever had this work done for himself, or he would not make the statement that it is demeaning. It does not demean us at all, but is the most manly thing we can do. I cannot do such work in my own mouth, and I do not believe anyone can instruct a patient to do it adequately. I believe the gentleman is conscientious in his statement, but he does not understand the operation, nor look at it from the right standpoint. If he had seen the results from this work that I have, he would not place himself in the catalog of a scavenger. I am glad to do this for anyone who needs it, and were I in a position today to change my location, I should go to a large city where I could specialize in this particular branch of our profession, and would do my work so thoroughly that I should never be ashamed of it, and believe that my patients would appreciate it so fully that they would be glad to honor me for my skill.

Dr. TAYLOR. I want to thank these gentlemen for the courtesy they have shown me, as far as I have been able to hear it. I labor under some disadvantage in that regard. Dr. Crawford speaks

est to us as dentists to study the reason why the simple act of masticating thoroughly the food ingested makes such a wonderful change in the general health.

Having been troubled with severe headaches since childhood my own case seemed especially adapted for study. By so doing I found that my saliva was subject to many changes—due to state of health, to changes in food, and in the amount of mastication. I also found that by masticating vigorously a large piece of rubber my saliva changed from a neutral to very alkaline reaction. When I was troubled with a headache my saliva was quite acid in reaction; but, even then, by chewing rubber the reaction would change to a less acid condition, and sometimes even to an alkaline reaction. This seems to show that the increase in degree of alkalinity of the saliva, while eating, is largely due to the act of mastication itself.

Mr. Fletcher determined that when he thoroughly masticated and insalivated his food it became of alkaline reaction, and by so doing digestion and assimilation were improved. As practically all our solid food is acid in varying degree, the chemical action of our alkaline saliva upon our acid food, as well as the changing of the starchy food into grape sugar by the ptyalin, must be an important feature in the mouth treatment of our food.

For a moment let us trace food that is not given proper mouth-treatment. All the richer foods are more acid than the simple vegetable food. If this rich and strongly acid food be bolted and washed down with coffee, which is often acid, or beer, which is always acid, the saliva does not have a chance to act upon the starchy materials; neither is the acid reaction of the food changed by the saliva, but the whole mass goes into the stomach in an acid condition. By Anstie's law respecting glands we know that the acid-excreting gastric glands are stimulated by the presence of alkaline substances. If the food be not converted into an alkaline mass in the mouth, the stomach glands are thus deprived of their natural stimulation. The result is that after a time the stomach becomes simply a reservoir for ingested food, and does not perform its share of digestion. As every succeeding stage of digestion is modified by the preceding, we can appreciate the importance of the first step being perfectly performed. This fact is even better understood when we know that all our digestive fluids seem to alternate in reaction, each depending on the previous one for its natural stimulation. First we have the acid food stimulating the alkaline-excreting salivary glands; second, the alkaline saliva stimulating the acid-excreting gastric glands, and so on to the last, which is the alkaline pancreatic juice.

This order is remarkably well shown even in infancy, before the salivary glands are developed; for naturally the child is nourished by the human milk, which is normally alkaline. This is taken directly into the stomach, the gastric glands thus having their natural stimulation, *i.e.* alkaline milk.

As the deciduous teeth erupt the salivary glands develop; as the child is given food, the least acid food first (crackers, crusts, etc.), the saliva becomes equal to the task of converting it into an alkaline solution. If the task be too great, the stomach rebels and the food often is thrown off.

Is it a wonder that our stomachs become sour, and that assimilation and metabolism are affected, when the first

or voluntary step of nutrition is ignored?—especially when we know that about three pounds of saliva are excreted and reabsorbed in a day, and when this may be so much changed by the simple act of mastication.

For a moment let us study the cow and her milk for comparison. The comparison is imperfect, but nevertheless may be of use. Cows when kept out of doors and left to feed upon grass which requires much cud-chewing to render it capable of being digested, are usually healthy and give milk of alkaline reaction. But when kept in barns and fed upon concentrated food such as animal meal, fine grain, or ensilage (which is a fermented food), they become subject to tuberculosis, inflammation of the bowels, and many other diseases. Furthermore the milk under these conditions becomes acid in reaction. As the cow is unable to chew her cud as much when fed fine and concentrated food as when fed grass and coarse food—does not the act of cud-chewing itself become a factor toward the health of the cow and the condition of the milk? We know that, normally, cows' saliva is alkaline, and that when cows chew upon one side only, the parotid saliva is increased in amount upon that side. If the cow's stomach and system are deprived of this increased amount of saliva obtained by cud-chewing, why should not the blood and milk be affected? Again, cows that have been kept in barns all winter have been known to chew pebbles or old leather in the spring. Does not instinct tell them that their systems need the saliva thus obtained?

The causes and effects of hyperacid saliva are so closely allied that it is hard to differentiate between them; however, among the factors concerned in the cause might be mentioned excess of rich and soft food, lack of elimination of the acid waste products of the system by perspiration, and lack of the neutralizing effect of alkaline saliva obtained by thorough mastication of food.

The effects of over-acid saliva would be hard to enumerate. It is certain, nevertheless, that they are varied and far-reaching. The local effects upon the teeth, manifested as erosion, caries, hypersensitiveness and pyorrhea alveolaris, are too often seen to need describing. Furthermore the systemic effects due to its reabsorption with its load of offensive secretions from the pus pockets around the teeth and from the coated tongue must be detrimental to the general health. The most logical remedy for these abnormal conditions of the saliva seems to be obtained by using to its fullest extent nature's neutralizing fluid of the system, *i.e.* alkaline saliva obtained by thoroughly masticating our food.

As the high standard of health seems to be our best safeguard for resisting disease, ought we not give the first step of nutrition—important in so many ways—its just consideration?

Discussion.

Dr. J. P. Corley, Greensboro, Ala. It would be unfortunate to let such a paper pass without comment. It is something that has not been brought to our notice much, but there is a good deal in it. I think we should follow the subject farther. I think, however, the essayist has laid too much emphasis on the influence of the alkaline reaction of the saliva, and its stimulation of the gastric glands. That is of very little importance, because the act of mastication itself has a very de-

cided stimulating effect on the glands of the stomach, but I believe, gentlemen, the most profound stimulus comes through the sense of taste. We are all familiar with the phenomenon which takes place when our olfactories inform us something good is going on in the kitchen. Our mouths water. The reflex action on the salivary glands is profound, and the effect of taste on the gastric glands brings about a corresponding stimulation there, together with the act of mastication.

Another important consideration is the aeration of the food. We are familiar with the effect which a sodden biscuit has on our stomachs. It is because the particles of gluten are not separated, and it is something like acting on stone; the only part which can be acted on is the outside, but if it be separated by particles of air, when the bolus goes into the stomach it is permeated by the gastric juice. So we have a good many factors to consider in this act of mastication, and it might be followed out still farther. The subject of the paper is a very important one. Our medical friends a few years ago raised a great cry for pre-digested foods, and the manufacturers put upon the market all sorts of concentrated extracts, thereby robbing the stomach of its normal stimulus. The food went into the reservoir, where it lay without being taken up. Now we are crying for grindable food, and they have gone to making shredded foods which offer abundant opportunity for mastication, which we so much need. I am glad that scientific men are looking around and studying nature, which is the great teacher of mankind.

Dr. R. T. Oliver, West Point, N. Y. I have listened with great interest to this paper. It embodies a number of important points that should be taken up for careful consideration. The theory as to different classes of food being required by individuals in different climates may be true, in so far as it pertains to the natives of the respective climates, but certainly does not apply to persons from a temperate zone going into the tropics for a more or less temporary residence.

Having just completed a three years' tour of service in the Philippines, I base my objection upon conditions observed, and upon experiments tried there. It is true that a vast majority of the poorer natives do eat the so-called tropical food, composed of fruits, rice, fish, locusts, etc., but whether such food is more beneficial to them than that of another character would be is a matter of considerable doubt in my mind. The cause of their selection of this class of food may be on account of an inherent instinct to take only what is good for them, or it may be due to some sort of a craving for just such articles; but I must say that I am inclined to be skeptical of these beautiful theories, and rather suspect that the real reason the native takes to the "tropical" food so readily is because it is easiest to get, costs practically nothing, and requires so little energy either in procuring or preparing it.

The average Tao's board bill comes very near being nothing a week, the only expense being a few centavos for rice. It is true they thrive on it, can work all day (when kept at it), and can stand long marches or "hikes" through rough mountain or jungle country, and it is also true that such a diet is not a heat-producing one. But on the other hand, the *personnel* of the Philippine scouts, our colonial army, have been doing excellent work, demonstrating great powers of endurance under splendid health conditions,

upon the regular army ration of meat, bread, potatoes, etc., as used by our army in this country.

In contradistinction to this, experiments have shown that the American in the tropics, when taken off his regular bread, meat and potatoes ration and put on experimental fruit or vegetable ration suitable for the tropics, did not thrive well, soon began to fail in strength, physical endurance, and resistance to disease, and had to go back to the old regular temperate-zone food.

Therefore it would seem that the character of food for the various peoples of the earth depends, indirectly at least, upon the natural habitat of food products, ease of procurement, facilities for preparation, and upon the individual's taste, habit, idiosyncrasy, or choice.

A remarkable fact in regard to the possible effect of certain foods producing an apparent immunity to certain diseases, was noticed during the terrible cholera epidemic in 1902, when over 100,000 people died from that disease. Our American soldiers stationed throughout the archipelago, and freely mingling with natives at all the towns and villages throughout the most plague-ridden districts, did not succumb to the disease as did the natives.

At first glance an explanation might be advanced that the American soldier, being fed on a better class of food, was stronger and more capable of resisting the invasion of disease; but another and more logical explanation is that the American was a meat-eater, a consumer of nitrogenous foods requiring in the stomach large quantities of hydrochloric acid, which attacked the outer capsules of the cholera germs, thus permitting of their complete destruction by the digestive fluids before they could advance far enough into the system to cause trouble.

The poor fruit and vegetable eaters readily succumbed to the dread scourge, being wholly unprotected and at the mercy of the insidious water-borne germ.

Dr. Howe. I wish to thank those who have spoken. Respecting the criticism of Dr. Oliver that the food of different climates was adapted to the men of those climates, I would say that the statement was intended as a very general one, and to counteract the vegetarian idea prevalent in some places. I think an entirely vegetarian diet in the arctic zone would be bad.

Dr. Oliver. The generally prevalent idea is that the climatic environment largely selects the food. That is largely so from the native standpoint. The native could not live on our American meat diet. He would not last.

The next order of business was the reading of a paper by Dr. B. J. Cigrand, Chicago, Ill., on "Mandibular Action: Its Influence on the Entire System," as follows:

Mandibular Action: Its Influence on the Entire System.

By B. J. CIGRAND.

THE title of my paper might induce some few of you to the conclusion that the subject more properly belonged to a medical program, hence should be pronounced foreign to dental consideration. The fact that the general system is under consideration should not lead to the inference that as practitioners we should forego the privilege or duty of giving the matter thought, nor should it foster the idea that we are usurping beyond dental limitations. As time goes on it becomes more apparent that our professional duties indicate that we concern ourselves more diligently with every phase of human disorder induced or provoked by any dental disturbance. This may seem a rather broad definition of our calling, yet our service is limited by legal rather than by physiological laws.

Our profession would at this day and age receive greater consideration could we impress the public with the fact that our services are truly important, and that organic and functional disorders throughout the human system can be directly traced to abnormal or disorganized oral conditions. I know of no method, policy, plan, or purpose which would more engender public respect than the one calculated to educate the masses to a realization of the broad and far-reaching influence our services may have upon the general health of the person.

Your committee asked that I write this paper, and the request, I am informed, was prompted by the cordial reception recently extended when I read before the Chicago Medical Society my paper entitled "Systemic Health, Its Dependence on Dental Order." In my paper before this association I hope to emphasize features of the subject that were merely touched upon in the former article.

Possibly the most interesting theme of all life is the subject of cell physiology, and the possibilities which this *kentniss* possesses is far beyond the ability of the human mind to describe. If we thoroughly understood the single cell, all living bodies with their wonderful complexities would soon resolve themselves into plain and easily understood objects. The recent experiments of Prof. Robert Hamilton tend to prove the existence in every highly organized development of two lives, the one a life resident in every atom of the structure, the other the unity of all these atomic lives—a life for which we have failed to find an expression. Notwithstanding that the atomic lives are subordinated by the grand or central life, the latter is dependent on the atomic energy, and a co-existence is established which science has yet to solve.

Just as each atom contributes to the entirety, so every fiber contributes to the organ, and in turn every organ donates to the perfected whole. And in the same ratio the entire organism depends on the parts or subordinaries. Every fiber in animal life is subject to development or decadence. The progression or retrogression is dormant or alive according to its size or importance. In animal life activity and development are synonymous terms, while disuse and waste are similar words. In the animal kingdom the forces of destruction are constantly at

work, and the forces of renovation and repair are equally active, but they do not remain perfectly matched, for at times the energy of the mind or body may be so great as to overtax the residual forces, the physical being becomes exhausted, and if this activity be continued the body soon suffers, as indicated by loss of weight and lack of mental vigor; and again, we may have the forces of repair the ruling agent, and the mind is clear, the body strong, and the entire nervous system alert and vitalized. This constant war of forces is largely supplied by the food we eat and the mental energy supplied. A sluggish person, slow of movement and of thought as well, does not destroy the cellular life as rapidly as one who is active and industrious; but the latter has the advantage of living under the influence of new and quickened vitality, since his energy wastes the elements and eliminates this waste product, while the indolent harbors this poisonous matter because of the lack of molecular and fibrous exercise. Every action, be it mental or physical, necessitates destruction; and the tissue or part which has been affected must of necessity be restored, or the waste would be greater than the repair, which would mean early decay and death. A wise arrangement in nature provides for this loss, and rebuilds the broken-down tissues of the body continually. By this process of animal restoration, so far as weight is concerned the body might be renewed several times in a week; but the pounds of food we eat are not all nutriment to the human frame. A considerable portion of what we eat is innutritious, and though useful in various processes is not destined to repair the losses of the general system. To meet these constant chemical changes two materials are essential, food and air; and during the first half of our lives the repair somewhat exceeds the waste, and our bodies grow larger, stronger, and heavier; while in the latter portion of life the opposite force seems to govern our destinies.

Nutrition and repair have come to mean the same, and both are symbols of life. The rapidity with which these changes are carried on is far greater than is usually supposed. Paley, in his "Natural Theology," claims that the entire living organism is renewed in seven years; but recent investigation has cast aside the mystical figure seven, and has substituted in its place the word "time."

Nature despises disuse. She has a standing resolution which reads, "The idle and unused shall be cast off," and this applies to the teeth, which, allow me to say, are no exception to this edict. If you were to have your right hand bound close to your chest and it were to remain so for a period of one year, you would not be able to control it upon emancipation. Use and development have come to mean the same, and nature furnishes an example in the sightless fish at the Mammoth Cave, Kentucky. Nature says, Why have these eyes, when they are not used? Atrophy in nature, as in political life, means waste and death: as in the whale the teeth are embedded or incased in the jaw and never erupt; the whale having no use for them, nature does not beget the teeth. All life testifies to the primordial law that what is not employed shall be gradually destroyed.

The general public in the cities have been inoculated by the virus known as haste, hustle, and hurry. Their meals are eaten in five minutes, and only substances requiring little chewing are chosen from the bill of fare; and we have

learned long since that the teeth need organic exercise. Hasty eating brings with it deranged alimentary conditions, and this always means an acid bath for the teeth, and this means eventual destruction. If the American people are suffering from a general disease it is indigestion superinduced by insufficient mastication of foods. Hasty eating and modern cooking have eliminated more good teeth than has accident or old age. While visiting England I was impressed with the good sense of the people in that they observe the rules governing appetite better than we who excel in our love for the pleasure of life. It is quite perplexing to the American to be obliged to spend so much time at the prandial board, but the English custom of "loitering at the meal" is indeed an expression of national wisdom. Washington Irving, in his "Sketch-book," clearly portrays the English love for a "good substantial dinner," and throughout the Continent as well the folk seem to take the full hour for dinner. The old saying, "After dinner sleep awhile, after supper walk a mile," has grown obsolete, and belongs to an age when people worked to live, while now we live to work.

Again, we overlook the necessity of jaw movement in the process of digestion. Foods which are "prepared," so called, require little mastication, and in taking them we cannot guard against dyspepsia and kindred stomach disorders. The food must be left in the mouth sufficiently long to be saturated with saliva and to assure its liberal flow; the jaw must be set in motion. Oatmeal, and the various breakfast foods, do not require this, and the sucking or mere process of deglutition does not bring forth the saliva, and hence the proper action of the saliva is omitted, and this will have its ill results on the effect and force of the food. We should choose such foods as will stimulate the flow of saliva and develop the glands and strengthen the secretions. Select foods which exercise the teeth. This stimulates the circulation in the peridental membrane and induces a quickened circulation in the tissues of the gingiva, and possibly wards against pyorrhea and other forms of diseases of waste.

The mere moving of the jaw as in speaking does not stimulate the glands sufficiently. Experiments which I have made have led me to conclude that the parotid and submaxillary glands are provoked into action by tension of the masseter muscles—that these muscles during their vigorous activity stimulate these glands.

The mind exercises a powerful control over all atomic life, and the student of cell physiology, as well as the pupil of nature, need not go beyond their own bodies for a laboratorial or ocular demonstration.

One hears and reads much in these times of muscular and athletic development induced by exercise and mental influence. This cannot be known as a new idea; the basic thought of this system can be found in a sentence by Darwin in his "Descent of Man," page 30, where he speaks of re-developing organs or nerve or muscular fibers as follows: "I have seen one man who could draw the whole ear forward; other men can draw it upward; another who could draw it backward. It is probable that most of us, by often touching our ears and thus directing our attention toward them, could recover some power of movement by repeated trials."

That the exercise of the jaws and mental direction changes the face I firmly

believe. I have observed in patients who had suffered the loss of most of the teeth on one side of the mouth that the cheek was thinner and more flabby. I concluded that this was entirely due to the loss of the teeth, but I have come to believe that since the patient cannot masticate where there are no teeth, the entire exercise is conducted on the side containing teeth. The additional work placed upon this side of the mouth develops the salivary glands doubly, while on the opposite side atrophy practically sets in, causing absorption and thinness of the cheek.

Again, nature has so arranged the salivary system that the glands will only respond on that side of the mouth where actual mastication is in progress, again proving that the glands excrete only under pressure. The sucking or mere swallowing, as is done in eating soup and soft foods, does not beget a free or full flow; movement of the jaw is not sufficient; it requires pressure. The jaws must be forcefully brought into antagonism, and thus produce an effect on these glands. Besides the action of the jaw, the mind should exert its influence upon both jaw and glands. The effect of mind over body is well and most easily demonstrated regarding oral secretions and flow of buccal mucus. Mental exertions exert a control over its flow, sometimes diminishing it as in moments of great anxiety. Its flow is often completely stopped by fear, while suggestion increases it and not infrequently induces an abundance of the watery fluid.

The saliva has many functions. It is a necessary intermedium in the sense of taste: substances to be sapid must be more or less soluble in this juice; if insoluble, they are tasteless. It moistens the interior of the mouth, aiding the art of speech. But, chiefly, it promotes the process of digestion, and with this latter fact we should be more concerned, since its flow is, I believe, controlled by the activity of the jaw—I do not mean by mere jaw movement, but jaw action. Nature requires that the food shall be crushed and pulverized by the teeth, and softened and chemically changed and prepared by the saliva, and when these two processes are accomplished, the food is ready for the stomach. The present prepared foods do not beget jaw action, hence I contend do not receive the proper amount of parotid saliva, and the foods lacking this pre-stomachic treatment must of necessity lack in the blood-producing elements. The mischief of this poorly prepared morsel may be one of the prevailing ailments of dyspeptics, and may also be conducive to the ravaging increase of consumption. Tuberculosis makes great headway in any system that is exhausted; in any person whose vitality is low; in any individual whose energy is lessened through impoverishment of blood. The action of the jaw being omitted, the flow of the parotid saliva is scant, the food morsel improperly prepared, digestion disturbed, the blood impoverished, and hence, with the lack of organic and systemic energy, tuberculosis, pyemia, and all consuming diseases readily progress. All this destruction of human life has been aided, not induced, by disregard of the cardinal principle of digestion, by our present methods of hasty eating, giving neither thought nor time to the process of manducation and mastication—the human or civilized species disregarding nature's greatest and most divine requirement, histogenetic digestion. A case recently brought to my attention may be of interest in this direction: A young lady

patient who sustained an injury to the temporo-mandibular articulation, resulting in positive immobility of the jaw and in her being obliged to exist on liquid food, gave evidence of the immediate effect of jaw and dental exercise in that her teeth loosened and the parotid saliva practically ceased flowing, her health soon disappearing.

Men versed in the art and science of stock-raising will bear testimony that cattle, as well as swine, which are denied opportunities of vigorous jaw exercise soon lose the teeth and become diseased.

While pyorrhea alveolaris is classed as a disease, gomphiasis must be termed a physical condition that is sometimes noted in middle-aged persons. Gomphiasis presents the same relation to the physical economy that gray hair does—being indicative of age—but not necessarily so. In gomphiasis the teeth are loose, they seldom present decay, and are of a cream yellow shade. There are no signs of alveolar absorption or the presence of waste product or pus. The teeth are generally long, and possess ill-shaped cusps; never bell-shaped, but rather of cubic outlines. My attention was directed to this abnormality something like twelve years ago. Gomphiasis is so akin in its manifestations to pyorrhea alveolaris that many practitioners make the mistake of treating it with medicines and instruments adapted to pyorrhea, and meeting with ill results are apt to pronounce it a stubborn case of gingivitis, and invariably recommend the extraction of all the teeth, substituting artificial ones, when it remained within the dental province to restore and save the natural dental organs. The extraction of teeth in such a case is entirely contra-indicated, inasmuch as appliances will give stability to the affected parts, and they will speedily yield and become normal in character. The abuse some dentists accord in case of this defect is astonishing. A healthy tooth submitted to such digging would induce a severe and distressing inflammation.

I have observed that cases of gomphiasis are mostly found in people of the lymphatic temperament and cannot be termed an abnormal condition, inasmuch as the osseous structure of their being is of a less dense or firm nature. The gums are naturally flabby and the entire system is rather of a lower form. We may readily recognize this temperament by the following general and special characteristics:

The lymphatic temperament. To the ancients known as the "phlegmatic." This temperament might be called stomachic or digestive. External indications: Round and well-developed jaws. Constitutional outlines fleshy and bulky; general movements slow and sluggish. Hair coarse, straight, and drab. Fingers short, flabby, and cold. The jaws have a decided lateral movement. Teeth-cusps flat, and rugæ indistinct.

The primal requisite in treating a true case of gomphiasis rests in rendering stability to the troubling teeth, and in granting exercise to the jaw.

The subject of mastication is one in which we as dentists ought to be profoundly interested—not alone in the *genus homo,* but in the entire animal kingdom, since a full understanding of the process of eating and the philosophy of mastication can come only after a diligent study of comparative anatomy. Now, I believe that all animals having teeth eat, yet not all animals having teeth masticate. To me the word mastication means the process of cutting, grinding, and crushing of food; and this word ac-

cording to such inference relates most happily to man, since his jaws admit of the functions of cutting, grinding, and crushing. So that the essential event sought is to establish a tightness of these teeth by natural means and hence afford nature the opportunity of restoring the wasted parts and rejuvenating the affected regions.

I have aided patrons most emphatically by advising the chewing of spruce gum or tar, and in some few instances have cured what was pronounced a distressing form of pyorrhea alveolaris. I hold to the opinion that too many teeth are treated as pyorrheal which simply require action of the jaw.

Our crowns and bridges would last longer if we instructed patients how to put force upon them. As it is now, practitioners dismiss the patient with the edict, "Do not bite hard on the attachment, as it will not endure under severe stress or strain." The result is that the teeth or roots upon which the case is anchored are jealously guarded, and no jaw force exerted. The roots soon, from disuse and protection, become loose, and the bridge or crown becomes a failure because of professional warning. Better instruct patients to bite naturally, using the normal force, even at the expense of repairing or of constructing new appliances; the patient's appearance is secondary to his health. It may be esthetic to place on a short bicuspid a porcelain crown, and it may be acceptable to caution the patient against eating on that crown; but I hold it better dental service to adjust a well-contoured and accurately fitted gold shell and say to the patron, "Now, use that side of the mouth; eat naturally, and retain your health." Porcelain has its place; porcelain has its mission; but when I find that I cannot use bulk and get substantial results, I somehow still hold that the properly formed and carefully adjusted gold molar has merits congenial to the laws of physiology.

The dental profession should not construct appliances which will hinder normal masticatory forces. The action of the jaw, its influence on the osseous and vascular tissues, together with its effect on the six major oral glands, and the innumerable minor ones secluded in the cheek and mouth, should not be jeopardized to frail and pretty prosthetic substitutes.

Our field of work leads us to give our attention to the minute changes which are constantly going on in the oral cavity. The alterations may be physiological or chemical, and their results may affect the most distant parts of the body. This study belongs to us; we should have the right to advise our patrons regarding their health, provided the mouth or teeth contribute directly to that end. By this means we shall render service along lines in strictest harmony with our training, and tend to give greater importance to one specialty of medicine.

Discussion.

Dr. A. O. Hunt, Omaha, Neb. I am very much interested in the papers I have heard, as they are all along the modern lines of prophylaxis. Of course some of it is classed as new. It is new to the extent that some attention is being paid to it, and properly so. Mostly the papers have treated of physiological conditions with which we are familiar, and still, although we are familiar with them, we do not give the patient the benefit of that knowledge to the extent we should in our instructions to them. The use of the jaws is a very important thing in the

mastication of food. Without such use we could not get the proper stimulation of the salivary glands in the oral cavity, and without the proper condition of the saliva we cannot get the proper digestion. It has often been a question in my mind as to what kind of food suits mankind best. Some people cannot eat a morsel of roast beef without distressing conditions following. Another man cannot eat an apple without distress. Another could eat a box of fish hooks or a log chain, and never know it. The stomach of the individual has everything to do with it. Just now everyone is talking of the proper mastication of the food, and the absolutely cleanly condition of the mouth. The correct mastication of the food has much to do with keeping the dental apparatus in good order. We can hardly deny the fact that the dental organs have something to do with the final results of digestion and assimilation of the food. Nature could not have been wrong when she made the tooth the first organ of the body to be developed. There must have been some important reason why the development of the teeth should begin so early in the evolution of the fetus. The teeth are practically indestructible under natural conditions. It requires abnormal conditions and surroundings to destroy them. We see this result clinically and we have every evidence of that fact. A tooth may lie out on the prairies for any length of time and its enamel not be destroyed or injured in any way, while the bony structure of the jaw in a skeleton exposed to the same conditions would break to powder in the fingers. And so the teeth are found as fossil remains in the rock. They are taken out ages after their deposit with the enamel not changed or destroyed. So then, the normal structure of the tooth must be of paramount importance. We abuse it just the same as do our patients; do not take any better care of our teeth than our patients do of theirs. It is the surrounding of this ordinarily indestructible material with conditions that ought not to exist which causes the trouble, but a clean tooth will not decay.

Dr. A. W. Harlan, New York, N. Y. One of the most remarkable things that has occurred recently in dental meetings in connection with the preparation of papers, is that almost all of them have been on the consideration of oral hygiene, prophylaxis, and the use of the teeth in mastication. Last week I presented a paper on food before the New Jersey State Society, and this afternoon we have listened to three papers in this section, in each of which the principal idea has been with regard to mastication to produce perfect assimilation and nutrition. Dr. Cigrand's paper goes on, supplementing those of Dr. Taylor and Dr. Long. As I presented my paper last week, at the present moment I am ahead of all three; but the ideas are good, and the more they are disseminated to our patients, the better for the patients. If you hammer it into the minds of people that if they have teeth they must be used, they will choose the kind of food that will give to the teeth exercise. Dr. Oliver's remarks with reference to the Philippine Islands were timely. I have had occasion to read about the food habits of the Polynesian Islanders and the people of Iceland and Greenland. Most of them use the food necessary for the climate in which they live, but there are some exceptions. According to the experiments made on the soldiers at Yale College, it was found that a man weighing 147 to 154 pounds will eat and drink in twenty-five days about the weight of his body; one and a

half parts of which will be solid food, and four and three-fourths will be moist. In order to maintain what is known as the physiological balance, certain amounts of food must be ingested daily; when, therefore, in the effort to preserve foods, benzoic, boric, salicylic, and sulfuric acids with other substances are used, and more than 7½ grains are taken in the food daily, the stomach will rebel; flesh will be lost, the skin lose its bright appearance and the hair and nails be affected. Therefore I think if the forty thousand dentists in the United States will tell the people how to use the teeth, some of the diseases now prevalent will disappear in consequence.

Dr. CIGRAND (closing the discussion). I think it is certainly an indication of progress on the part of dentists of this country that they are giving attention to so important a subject. I am glad to hear the words of Dr. Hunt and Dr. Harlan regarding the profession's interest in such subjects, and also that instruction should be given to our patients. If each one would tell his patients these simple and ordinary physiological truths that most of them think they already know, it would make an impression. Many would say, "Of course we use our teeth; that is what they are made for," but it seems sometimes that these things we ought to know, and think we do know, are the things we know the least about, after all. I am very glad that the interest has been along this line. I have given it years of study from the mechanical side, am deeply interested now from the standpoint of the physiologist, and presume later I will be from that of the chemist, because these three sciences must work in harmony, being so interwoven that one cannot stand without the others. Dr. Hamilton gave the idea that the use of teeth is one of the primary requirements of life. Dr. Kidd of London said that appendicitis could be traced to the fact that we are not using our teeth properly, disregarding the principles of mastication. I believe one of the London medical journals stated that Kidd, who had probably performed more operations than any man on the Continent, said that appendicitis will pass away just as soon as we learn how to eat. If that be true, no higher compliment could be paid to the importance of our profession.

A paper was then read by Dr. A. W. HARLAN, New York, N. Y., on "A Review of the Question of the Treatment of Putrescence as Related to Pulps and Pulpless Teeth," as follows:

A Review of the Question of the Treatment of Putrescence as Related to Pulps and Pulpless Teeth.

By A. W. HARLAN.

IN this paper I do not presume to answer the question of what putrescence is, as related to the pulps of teeth, but I will premise that the whole subject is still worthy of the profoundest thought. I will however answer briefly that it is the destruction of the pulp through irritation, inflammation, and the agency of micro-organisms producing suppuration. This was guessed at more than a hundred

years ago, and teeth with putrefying pulps were cleansed of their contents and afterward filled with lead, cotton, and many other substances. It was not until the dawn of antiseptic surgery that the real nature of putrescence was understood as it affects the pulps of teeth. Even then the treatment of putrid matter in teeth was not based upon any defined method of destroying putrescent material. If you will consult the works of John Tomes, Chapin A. Harris, Thomas E. Bond, F. Maury, Lefoulon, J. Taft, or any other English, French, or German author before 1860, little was known or practiced in the destruction of the products of decomposition, ptomains or leucomains, putrescin, or any of the other varied *post-mortem* products.

With the advent of antiseptic surgery and the discovery that many hitherto unused drugs were inimical to germ life, our literature was flooded with numerous methods of handling putrescence and the stored-up poisonous matters that were infiltrated into dentin. Wood creasote, iodin, carbolic acid, zinc chlorid, alcohol, potassium permanganate, various oils and tinctures, all had their day. When knowledge concerning putrefaction became more widespread (about 1870) much of an amateurish nature was produced before the American Dental Association and the more prominent state and local societies in the United States and elsewhere. Even as late as 1881 works were published advocating the stopping of pulp-chambers with cotton soaked in glycerin to which had been added a little As_2O_3. Reform movements are accepted but slowly. Liebig himself and H. C. Bastian never would agree to the germ theory of disease, and they each had partisans and warm supporters. I heard Bastian read a paper in 1881 in which he still clung to the spontaneous generation theory of disease, and one day I had a long talk with him on the subject, in which discussion he maintained his position with great cleverness and much learning.

What is the definition of putrescence?

"*Putrescence*—The state of undergoing putrefaction." (Gould.) *Putrillage*—Putrescent material. *Putrescin*—A ptomain of decomposition. *Pus*—The fluid product of suppuration. *Putrescent, Putrid*—To become rotten."

"The formation of such gases as H_2S, PH_3, and $(NH_4)_2S$, give the offensive odor to putrefaction of soft parts." Tendency to, or incipient condition of putrefaction.

"If a tooth-pulp be allowed to decompose in a closed root-canal, an incredible amount of bad-smelling gas may be found, so that on opening the pulp-chamber the whole room will be impregnated with the odor H_2S, PH_3, and $(NH_4)_2S$." (Miller.)

Putrescence *per se* is not treated at any great length in the "American Text-book of Operative Dentistry." The most striking paragraph follows: "The septic cases . . . range from superficial ulceration of the pulp to its disorganization through the agency of putrefaction and the infection of the tissue beyond the apex of the root. . . . The second class of cases comprises those in which septic organisms have invaded the pulp along the direction of its veins and destroyed the mass of the organ through a process of suppuration."

"Fermentation produces acids; putrefaction produces alkalies. In the latter case, as already alluded to, ammonia and its derivatives, the amins and amids are characteristic together with exceedingly

poisonous and non-poisonous ptomains or animal alkaloids." (Cassidy.)

"Fermentation and putrefaction resolve a complex substance into a simpler form by contact with a minute living plant or animal." (Thomson.)

"Peptonizing ferments convert coagulable albuminoids into soluble and diffusible albuminoids or peptones, which are neither precipitated on boiling, nor by copper sulfate, ferric chlorid, mineral acids, or alkaline salts. Precipitable by chlorin, tannin, mercuric chlorid, silver nitrate and lead acetate, neutral or basic." (Thorpe.)

Putrescin is not destroyed by boiling or evaporation. It is insoluble in alcohol, but is soluble in water. Albuminoid substances which are frequently found in dead pulp are covered with putrescin, which is slowly dissolved with distilled water.

"A saprophytic organism attacks dead matter, but the pathogenic first of all attacks living matter and strives to kill it, and continues to attack it after it is dead. Sometimes an organ is facultative, then it attacks both living and dead matter." (Brunton.)

Often there is a struggle for existence between microbes, just as between higher animals, and if a number of mixed microbes are planted together in a nutrient medium, those will succeed first in which the medium is favorable. This is a simple statement of what is the known truth.

Putrescent pulps and putrescence in pulp-canals, and the consequence of putrescence beyond the apices of roots, seem at this day to have caused more trouble to dental surgeons and the people at large than all the other diseases of the teeth. All the energies of the chemist, the pharmacist, the therapeutist, and the bacteriologist appear to have been spent on discovering or producing antiseptics and disinfectants sufficiently potent to destroy putrescence and putrillage when within a root.

The journals from month to month grind out new papers on the treatment of foul root-canals with new drugs, or combinations of old and new drugs, so great in number that it is bewildering to a new graduate or even to the young practitioner. Have we at this day and hour a more potent destroyer of a coccus or bacillus than we knew of ten or even twenty years ago? At present the most recent books and papers are still struggling with the question—Geo. W. Cook, J. P. Buckley, J. D. Hodgen, and others, including MaWhinney in the latest work on oral pathology, who says that "the treatment of putrescent pulp is a simple matter" (page 94). Buckley proposes to treat putrescence with tricresol and formalin, using alcohol to separate the fat (?) and produce lysol, a soapy compound. Hodgen revives the sodium dioxid process of treating putrescence, while Cook advocates the use of phenol-sulfonic acid (phenol and sulfuric acid). MaWhinney's treatment is alcohol, beechwood creasote, "1, 2, 3," campho-phénique, tricresol, oil of cloves, etc. The Buckley and Hodgen methods, as well as Schreier's kalium-natrium process, are attempts to place the treatment of the putrescence of pulps and pulpless teeth upon a scientific basis.

A study of the ultimate products of putrefaction, and a determination of the varied substances found within a closed pulp-chamber is the basis for the treatment of putrescin. We have then to do with the peptones which are the "final, simplest products of the native albumins and neucleo-proteids." (Holleman.)

It is probable therefore that mono-

chloroacetic acid $CH_2—Cl—CO_2H$, diluted to 7 per cent. in the beginning of putrescence is indicated, and that trichloroacetic acid, $C—Cl_3—CO_2H$, diluted from 7 to 12 per cent. may be relied upon to disinfect complete putrescence before the products have passed through the apex of the root. After that period has passed, surgery or any preferred method is indicated. After the destruction of the putrescin and putrid material and its removal, use a weak solution of dried sodium carbonate, $NaCO_3$. Any mild dressing may be sealed within the root-canal after this treatment—oils, or aqueous solutions of known disinfectants.

Works consulted: MILLER, "Micro-organisms;" AITKEN, "Animal Alkaloids;" BOEDECKER, "Anatomy and Pathology of the Teeth;" MORLEY and MUIR, "Dictionary of Chemistry;" THORPE, "Dictionary of Chemistry;" HARRIS, "Principles and Practice of Dentistry;" BOND, "Dental Medicine;" MAWHINNEY, "Oral Pathology;" VAUGHAN and NOVY, "Ptomaines, etc.;" LITCH, "American System of Dentistry;" KIRK, "American Textbook of Operative Dentistry;" LEFOULON, "Dental Surgery;" MAURY, "Dental Surgery;" TAFT, "Operative Dentistry;" MARSHALL, "Injuries and Diseases of the Jaws;" CASSIDY, "Dental Chemistry;" MITCHELL, "Dental Chemistry;" SMALE and COLYER, "Diseases of the Teeth;" TOMES, "Dental Surgery;" ABBOTT, "Dental Pathology;" EAMES, "Dental Pathology;" GORGAS, "Dental Medicine;" BLOXAM, "Chemistry;" BURCHARD, "Dental Pathology;" COOK, BUCKLEY, HODGEN, various recent dental journals; PIGGOT, "Dental Chemistry;" HOLLEMAN, "Organic Chemistry;" CROOKES, "Chemical Analysis;" FOSTER, "Physiology;" WEDL, "Dental Pathology;" BROOMELL, "Anatomy and Histology of the Teeth;" E. C. KIRK, "Putrefaction;" TOMES, "Dental Anatomy;" SEWILL, "Dental Surgery;" TALBOT, *Dental Digest, Cosmos,* and *Journ. Amer. Med. Association;* BLACK, "Formation of Poisons;" KLEIN, "Micro-organisms;" CHEYNE, "Antiseptic Surgery;" PASTEUR—his Life; "Century Dictionary;" "Encyclopedia Britannica;" BRUNTON, "Lectures on Medicines."

Discussion.

Dr. GEO. W. COOK, Chicago, Ill. I did not hear the first part of the paper. As some of you may know, I have tried in a feeble way to do something in experimental work on this subject, and in this work am a little like the old German, who said in regard to reading the Bible, "The more I know about it, the more, by Geminy, I don't know about it." It is a subject that is always capable of being discussed in an intelligent way, but until we know more of tha subject of physiological chemistry we will be as we are now, somewhat in the dark as to many of its phases, because of the fact that the cause of disorganization of the enamel tissue in one instance is different to that of another. We have the so-called pathological germs that produce the disease process in the tissue. The part of the subject that seems to me the most perplexing is that the acids form in the pulp or in the tissues, and until we know more of that we will not be able to destroy many of these germs as easily as we think. Many of these acids may enter into and become a part of a circumspect protection to the germ life itself. The substance that the essayist has passed around ("mono-chloroacetic acid") I have not tried, but from its chemistry, and in this form, I would say it ought to be an excellent agent. From the reaction that would take place, this agent ought to destroy the surroundings of the bacterial cell. We know that the ordinary antiseptics will not do this unless of such strength as to destroy the surrounding tissues, and thus they are not reliable for physiological reasons. We have been inclined to think that because an agent is

irritating, and because if we put it on a rat's tail the rat will run away, giving evidences of pain, we can use it to kill microbes.

The things that we ordinarily regard as antiseptic are probably no more than food, or perhaps destroy the tissues in such a manner that the bacteria may enter in a more virulent way, producing worse diseases than those we originally attempted to treat. The protoplasmic cell is made up in such a way that it requires an agent that will enter and destroy that particular cell without destroying the tissue as well. Such would be a true antiseptic. Judging from the chemistry of this drug, it would be an ideal agent in a great many instances, but the feature arises that where we have a different cellular structure that we have what we say are pathogenic germs, which might require an entirely different agent to destroy them. The ideal antiseptic need never be looked for so long as we have such a variety of germs, because that which will destroy one will not enter another, and what will destroy germ life will, so far as we know at present, destroy the tissues more quickly than it will the lower vegetable life. The subject is a very interesting one. For instance, a review of the literature in the way he has brought it up is of great importance, because it leads directly to a line where one would be able to find the things he would like to look over and study, and make a comparative treatment if the case required. I appreciate very highly this excellent paper, and wish I could say something more directly germane to the subject.

Dr. L. E. Custer, Dayton, Ohio. I did not hear all of the paper, therefore do not feel qualified to speak, but was much pleased to hear this concise review of the subject as it was put before us by Dr. Harlan, who never does present anything that is not well worth our careful consideration.

Dr. C. H. Oakman, Detroit, Mich. I enjoyed the paper immensely. It is certainly comprehensive in every respect, both from a pathological and bacteriological standpoint. It is something we as dentists must ever bear in mind and look forward to, the time when we will have the proper antiseptics and disinfectants. In regard to the treatment of putrescent pulps, a gentleman today said he believed the only proper way to destroy bacterial life was by the use of formaldehyd gas. There is a gentleman in this room who is not a member of this society, and if it is your pleasure to have one who is not a member given the privilege of the floor, I would like to have him accorded that courtesy. I move that Dr. Lawrence of Kansas be given the privilege of the floor.

The motion was supported and carried.

Dr. F. B. Lawrence, Eldorado, Kans. Two years ago I prepared a paper for one of our Western associations by request, which I based upon a paper written and read by Dr. Harlan in Europe, in which he criticized every method known, to me at least, for the treatment of dead or putrescent teeth. That he was groping in the dark was proved by the fact that he did not then—nor has he now—offered a specific. Allow me to quote a little from the paper presented by me two years ago, and re-read recently at the Oklahoma Dental Society: "Several years ago, following the discovery of formaldehyd gas, the dentists of the world endeavored to use that powerful germicide and antiseptic. We had no method by which it could be applied to the teeth in their normal condition. I re-

member distinctly one case that came to me; to quote the language of Dr. Harlan, when I opened the cavity I found 'a stench that was not primary.' It had been treated. I did my best to preserve the root of that upper canine, but the patient returned after the canal had been sealed, suffering with pericementitis, and in desperation I reached for a bottle of the preparation of 'polymerized formaldehyd'—formaldehyd gas in a solid form. I had attempted to use it in an aqueous solution in various strengths; in 39½ per cent. it could not be used, as it had an effect on the gum almost equal, if not worse, than arsenous acid. I attempted to use it in the gaseous form, but could not. I failed with it mixed with menstruums. The bottle I picked up was of solidified formaldehyd. I placed a piece of this solidified formaldehyd, approximately the size of a pinhead, in the bulbous portion of the canal, covered it with a pledget of cotton, and sealed with temporary stopping. I discovered then, and from subsequent experience, that in this form the heat of the body caused the polymerized formaldehyd to return to its gaseous state more slowly than the moist parts contiguous to the root could absorb and eliminate the same. I got very little, if any, irritation from its application in this form. In the beginning of my experiments I succeeded in getting it through the apex of the root, but only when used in paste form or the aqueous solution—formalin. In some cases several hours of continuous pain supervened, but at no time did it fail to subside, nor the tooth to be conserved. In all the cases I have undertaken—and I do not say it in the spirit of egotism, for some I have not undertaken—but of all I did undertake to save I have had but two fistulous openings, and these formed painlessly. The cause of our failures in attempting to use formaldehyd is that the heat of the body (in any of the forms in which we have applied it save in this polymerized form) causes the eliminating of the formaldehyd gas with greater rapidity than the moist parts surrounding the tooth can absorb and eliminate the same, hence the escharotic or toxic effect."

It is impossible for me to discuss as scientifically the operation of this solidified formaldehyd as Dr. Harlan has just discussed the value or lack of value of our antiseptics, but I hope that my several years' experience of the successful application of this antiseptic may be yours. This form of formaldehyd conforms to all of the demands made by Dr. Harlan for the qualifications necessary to a perfect dental antiseptic. It is the most penetrating antiseptic we have; it is soluble in water; it does not produce a coagulum, thereby shutting itself out; its toxic or escharotic effect when properly applied is *nil,* and pain seldom or never follows its application unless it be in dead teeth, in which the simple act of opening seems to arouse all the latent forces in or around the apical portion of the tooth, and where, in spite of application of all known antiseptics save this form of formaldehyd, pain continues for several days through the stages of the alveolar abscess to its complete resolution. In such cases the abnormal activity of the diseased germs inclosed secures the start of the formaldehyd, and as a result there is some pain and soreness, both of which invariably subside within a few hours, when the tooth is ready for its permanent filling. In these cases this is a specific. I hope many of you will try this preparation, and I hope to hear from you with reference to your success or failure with it.

Dr. F. W. Low, Buffalo, N. Y. The members of our New York State Dental Society received blanks, asking that they make a report at the next meeting upon the feasibility of the treatment recommended by Dr. Buckley, of which Dr. Harlan has spoken. When Dr. Buckley was with us at Albany he made the chemical equation on our blackboard, showing why the combination was beneficial. I have used it for five putrescent pulps, sealing it in with gutta-percha with no resultant pain, and believe it will control the tooth without pain in these emergency cases. I should be afraid of the method used by Dr. Lawrence, as I have had disagreeable effects with formaldehyd when used alone. If the paraform does not decompose and change to gas too rapidly, the tissues will perhaps tolerate it, but in some mouths I would be afraid it would change to the gaseous form so rapidly that it would force the gas through the apical foramen. It is not an antiseptic in the sense we use it. It will destroy germs, but it will destroy the tissues just as rapidly, and we must be cautious. I am one of those chemists who know so little I should have been afraid, had not Dr. Buckley showed the chemical equations to us, and his reputation is such that I felt disposed to take his findings upon trust. I desire now* to add that after some months' experience, I have never had occasion to regret having used this combination of formalin and tricresol.

Dr. Cook. The subject of paraform interests me. Some years ago, when it was first brought out, I was working in the bacteriological laboratory of Klebs. It is simple, and there are some beneficial things with reference to it. It is prepared by evaporation of formalin. It is the best thing I know of, but it must be heated. With reference to the irritating properties, for instance, the tooth is sealed tightly, and there is enough moisture to allow the resorption of that gelatin to release the gas. In the majority it is gradually given off under pressure. In the treatment of a tooth, anything that is liberated in the form of gas or moisture is ordinarily irritating, and more irritating under pressure than anything else, especially at the temperature of the mouth. The formaldehyd paraform may remain without a particle of the gas being liberated, but if you put that under pressure at the temperature of the mouth, you have another condition entirely, which depends on a great many factors that may enter into the liberation of the gas and consequent irritation. The main point in Dr. Lawrence's treatment is his manipulation of the substance, rather than the substance itself—the seeing that the tooth is dry and all that. Tricresol and formalin, I presume, are about as familiar as anything, and in most conditions the formalin is absorbed by the tricresol. It will go in about three per cent. When formalin is added the tricresol will take up a large quantity, and gives it off the same as it does the gelatin, depending on conditions largely; and if you have any irritation from it the antiseptic quality is due to the tricresol. I believe if the tricresol be used alternately and tab kept of the tricresol and formalin, comparing them, the results will be interesting.

Dr. Lawrence. I believe that the solidified formaldehyd and the paraform are different. In boiling formalin in a sand-bath you secure a white precipitate; this is the pure formaldehyd. You

* October 1905. Date of correction of stenographer's notes.

may use it in putrescent teeth in any form, and it is absolutely inert without the presence of moisture; hence do not dry said teeth. As I hope to demonstrate in my clinic, I give as thorough instrumentation as possible.

I use the form of formaldehyd that eliminates this gas very slightly. I do not dry the teeth but leave them moist, knowing positively that the formaldehyd gas will seek, as a ferret seeks its prey, through every crack and cranny, through the tubuli, to and beyond the cementum, thoroughly tanning the protoplasm of every pathogenic germ, and positively sealing the inclosed nuclei of the cell forever from proliferation. I have not been compelled to extract a single tooth that I have treated with this preparation, but there must be special attention given to its application, for as dynamite is to explosives, as cocain is to anesthetics, so is solidified formaldehyd to antiseptics. Its proper application will be as redolent with good results to our patients as the proper application of cocain has been. Allow me to congratulate Dr. Harlan on his excellent paper, and to say it is a pleasure to hear the truths dropping from his lips, in the discussion of which I know my inability.

Dr. Harlan (closing the discussion). The title of my paper was "A Review of the Question of the Treatment of Putrescence as Related to Pulps and Pulpless Teeth"—of what other people have said and done in their study of this subject. I found what I thought were some weak links in the chain of the treatment of putrescence and the principal animal alkaloid, namely putrescin, which is soluble in distilled water. We could wash out the interior of the tooth first with distilled water, and get rid of most of the putrescin, and the reason I proposed the use of the mono-chloroacetic acid is that it is less irritating than some other things. When it comes in contact with H_2S and PH_3 it unites chemically, because it has a loose carbon atom, and is destroyed when you thoroughly saturate the putrescent mass or putrillage. Then you have accomplished the thing chemically. You can seal the tooth without danger of trouble. There are three cresols united in the formula of Dr. Buckley in the tricresol, which is soluble in water to a certain extent, and all three of them enter into what is known as lysol by the addition of soap. Dr. Buckley proposes to wash out the fatty acids resulting from the decomposition or putrefaction of the pulp; he proposes to separate the fat globules by the use of alcohol, and then with the cresol make soap of the fat, and get rid of it in that way, by disinfecting the putrid material in that form. This subject deserves the profoundest thought of our scholars, and we can only get that by a more complete study of what is known as physiological chemistry. Something more must be learned than we now know with reference to putrefaction. Nearly all the writers on the subject seem to feel that putrefaction and fermentation come under the same head. Anyone who has studied it will know that you have in the putrefaction of the animal matter in the pulp-chamber an alkaline condition to meet.

Dr. Hodgen gave us a paper with reference to the action of sodium dioxid on putrescent pulp, etc. I disagree with him in his conclusions. I have given credit to the different methods of the different writers fairly and distinctly, and

I will state now, for the benefit of those who have not recently studied chemistry, that everything has been revolutionized in the last ten years, and you must throw away your old books. At the present moment the very best thing for treating a putrescent condition and putrescent material when accompanied by gases is an acid substance, not a basic acid itself, which will combine with this substance and render it inert, producing the best disinfection we have been able to discover up to this moment.

The meeting adjourned until Wednesday July 26, at 3 P.M.

SECTION III—Continued.

SECOND DAY—Wednesday, July 26th.

THE meeting was called to order by the chairman at 3 P.M.

The first order of business was the reading, by Dr. ELI H. LONG, Buffalo, N. Y., of a paper entitled "The Professional Man's Disease," as follows:

The Professional Man's Disease.

By ELI H. LONG.

IN a recent number of the *Journal of the American Medical Association* there were tabulated the causes of death of 2142 physicians occurring in 1904, showing an average age of about sixty years. The average of years of practice was about thirty. While all cases could not have the cause of death accurately stated, the summary of so considerable a number gives some data of value. The chief causes of death are stated as follows:

	No.	Per cent.
Heart disease (including sudden heart failure)	205	9.57
Cerebral hemorrhage	179	8.35
Pneumonia	172	8
Nephritis	91	4.24
Tuberculosis	90	4.2
Cancer	39	1.8

It will be noticed that heart disease was responsible for the largest number of deaths (9.57 per cent.); cerebral hemorrhage followed closely (8.35 per cent.); making a total of nearly 18 per cent. from diseases of the circulatory system. In addition to this, it is probable that in the 4.24 per cent. due to nephritis, disease of the bloodvessels predominated in a sufficient number of cases to make the total percentage for circulatory diseases fairly approximate 20 per cent., while the deaths from the two chief respiratory diseases, pneumonia and tuberculosis, together make up only 12.2 per cent.

This is in strong contrast with what obtains in all mortuary statistics up to middle life, for there deaths from respiratory diseases far exceed those from circulatory diseases. The fact is that at middle life we have passed out of the period of greatest vulnerability to infections into the period where disease is more commonly due to degeneration.

This is a distinction of importance, as we shall see later.

The figures cited cannot be taken as proving that medical practitioners are more subject to diseases of the organs of the circulation than persons of all other occupations; but, taken in connection with our daily observation, it indicates that in persons who pre-eminently are living the strenuous life, the wear and tear are most productive of harm in the circulatory system. It is likely that similar results would appear in any class of professional or hard-working business men. To bring the matter a little closer home, I am convinced that what applies to the physician in this regard will apply as well to the dental practitioner. While the latter is not subject to the irregularity of sleep and of meals of the former, he works harder during his long office hours —while he also breathes less pure air and takes less exercise than his medical neighbor, which are factors of importance.

The prominence of circulatory diseases may seem to you incompatible with the statement that death from simple primary disease of the heart is not common. Except in the acute infections, in the very bad cases of valvular disease, and in rare conditions, disability of the heart represents conditions more or less general, the causes of which must be sought outside of that organ. In our search we have learned to give much attention to the bloodvessels, and particularly to the arteries. The occurrence, in such a series as this, of more than 8 per cent. of deaths from cerebral hemorrhage, forces this upon us; for this accident, commonly called apoplexy, always means disease of the arteries leading to rupture.

Viewing this as one of the common and natural terminations of life, we cannot object to the sudden blocking of the conscious activities by the presence of a blood-clot in the brain in persons who have done their life-work and have reached an advanced age; for the event is probably as painless as chloroforming and nearly as certain, if sometimes slower. But it is because of the fact that there are annually, in the aggregate, thousands of comparatively young men, among the most active and useful citizens of our country, who are either suddenly summoned, or gradually incapacitated for duty, by inroads of degeneration in the circulatory vessels—obscure at first, but capable of being retarded—that your attention is invited to this topic.

A further fact that must appeal to us is that, while many cases can be traced to a vicious life as a cause, very many still occur in those who make hard work either a cardinal virtue or an imperious master, to the neglect of the welfare of the body. While feeling that they are serving their day and generation well, they may be dishonoring their Maker in a most wasteful abuse of their powers. Be this as it may, we often see the most useful, the most needed by society and their families, cut down before their time.

This brief paper cannot attempt to analyze all factors concerned in premature degeneration, but only to emphasize the important ones, with practical suggestions as to prevention and remedy. With our present knowledge it may be stated as a fact that the degenerations of age, and particularly when occurring early, are seen most prominently in the arterial system, and that they consist of a hardening, a weakening, and a compensatory thickening of the vessel walls. Atheroma is one name applied to the condition, although the more distinctive name

is endarteritis, the inner coat being the usual starting-point of the disease. Arterio-sclerosis is another term, which signifies the presence of fibrous thickening in the wall of the vessel. As you well know, these changes are often followed by calcareous deposits in the arterial wall, sometimes leading to the extreme stiffening of the vessel, which is known as "pipe-stem artery." The disease is usually evident, even early, by a palpable thickening which may be noticed in the radials and temporals, and by an increased arterial blood pressure which gives a strong pulse of high tension and an accentuation of the aortic second sound of the heart.

The pathology of endarteritis is not single. Varieties are recognized, among which the syphilitic holds a place of great frequency and importance. Heredity and diathesis must be noted among the causative factors, but as being of secondary importance in most cases. Chiefly as these factors contribute to early degeneration of tissue do they enter into consideration. Recognizing the frequent influence of early senility from whatever cause, we still come to the belief that the determining causes are mostly acquired, and preventable to the extent of postponing the occurrence of serious symptoms.

What, then, are the chief causative factors? They are of two kinds—structural and nutritional. We have entered upon the period of life when degeneration must be looked for. Recognizing this, we first mention the fact of a degenerative tendency, which is usually first seen in the lessened elasticity of the arteries. Their function of expansion during the systolic filling of the vessels and of contraction during diastole is diminished, with the result that the even distribution of the blood to the capillaries is interfered with.

It must be remembered that, while the heart's action gives force to the circulation, the reservoir and distributive function of the arteries is just as necessary to a normal circulation in the capillaries. And the fact is too commonly overlooked that in the capillary areas lies the most important part of the circulation; for the whole circulatory apparatus is arranged in order to a proper supply of blood to the cells of the tissues, where the real laboratory work of the system is carried on. As related to cellular conditions, it should be noted also that the capillaries are less abundant at this time of life, as many of them which were needed in childhood to supply the need of growth have disappeared since the completion of development. This combination of conditions would doubtless lead to early interference with cellular functions were it not for a compensatory provision in the fact that the heart grows larger and stronger as age advances. The increase of arterial pressure caused by the factors mentioned may stimulate this growth to a decided degree of cardiac hypertrophy, which for a time insures a sufficient blood supply, but which in time, with the progress of arterial degeneration, increases the danger of apoplexy. With these facts as a basis you will appreciate the statement that has become current in medicine. that "a man is as old as his arteries." Some men are older at fifty than others are at seventy, because degeneration of the circulatory system (chiefly the arteries) has progressed farther; and it may be added that no other condition can more reliably predict length of days than the condition of the arteries.

Thus far we have mentioned only the

factors that are in a sense normal—that may be expected to appear in the process of aging in any person. Were these recognized at the proper time for most efficient treatment, *i.e.* before any symptoms occur, we might succeed in prolonging life and usefulness for many years in the average of our cases. But cases do not come under observation until symptoms have appeared, or in other words, until the compensatory advantages have been outweighed by the progressive degeneration.

But to these structural or physical factors there are often added those due to improper living or working, which affect the nutritive processes more directly. The faults of living may be included in the terms *high living, irregular hours,* and *insufficient exercise,* or more briefly still, *too much food* and *too little exercise.* The faults of working are sustained *mental* or *physical strain, too great concentration, worry, long hours,* but sometimes *too little work* of a kind that requires physical exercise. The symptoms first to appear are those due to deficient oxidation and deficient cellular elimination. How are these brought about? Referring again to the loss of elasticity in the arteries, please note two points: first, that the supply of blood to the capillary area is likely to be intermittent, approaching what would occur if it were forced through a series of metallic tubes; and second, that there is less total force communicated to the venous return current, with a resulting tendency to accumulation of blood in the veins. Suboxidation, faulty metabolism and deficient cell-elimination must follow, and if high living and little exercise be the rule, it is plain that we have a blood surcharged with nutriment that can neither be fully used nor oxidized into harmless products. Elimination being at the same time deficient, the sum of results will be the retention in the blood of imperfectly oxidized, irritating substances, with toxic products that have failed of elimination. That kind of blood is taken back to the heart and is thence distributed to every tissue of the body, and there must follow serious disturbances of nutrition throughout.

The heart is one of the first organs to suffer, and we have here the basis of cardiac irregularity and degeneration. The sudden deaths that so frequently occur in apparently strong and comparatively young men must usually be due to an unsuspected degeneration of heart muscle from atheroma of the coronary arteries, or to thrombosis; but the influence, upon the nutrition of the heart, of a toxic blood in constant circulation must not be overlooked as a primary factor in causing degeneration.

We have passed rapidly to the more serious results of arterial disease so as to make our outline; but attention to detail requires the mentioning of two other points: First, that suboxidation in moderate degree conduces to the formation of fat, and the increase in weight that is often seen to occur rapidly in middle life may oftentimes mean a beginning arterio-sclerosis; second, the retention of suboxidation products and waste material in the blood are to be regarded as the essential condition of the gouty diathesis. We have been beguiled by the uric acid theory and the supposed lithic acid variety of the gout family of disorders; but we have rather too slowly learned that uric acid is not the harmful substance it was formerly supposed to be, and that its accumulation is not the cause of the gouty attack. But when we recognize

that auto-intoxications are the basis of most nutritional disorders we are in a position to treat them most satisfactorily though we may not be able to name the single offending substance in any given case; so in the conditions under discussion we must appreciate the factor of auto-intoxication which necessarily occurs with either a continued sub-oxidation or with deficient elimination.

Arterio-sclerosis is not always evenly distributed through the system. The coronary arteries in the heart may be particularly affected, causing degeneration of the muscle through insufficient blood supply; or the disease may be more advanced in the cerebral vessels, leading to an early apoplexy from rupture, or to cerebral softening from poor supply of blood in the locality; or the disease may be more advanced in the kidneys, contributing largely to chronic Bright's disease.

Right here I wish to emphasize the importance of the above considerations in relation to the constitutional factors in gingivitis. Either the presence of local arterial changes, or auto-intoxications from a general sclerosis may be important factors in the so-called "gouty" pericementitis, and attention to the lines of general treatment to follow may be of primary importance.

In accordance with the main purpose of the paper, our discussion of treatment will be directed to prevention and to treatment of the earlier and more remediable stage of arterial disease. As hinted earlier in this paper, the treatment will be most efficient if begun before the occurrence of symptoms. Practically, however, treatment begins with the appearance of the first symptoms, unless the condition is discovered incidentally.

The treatment of early cases will be hygienic rather than medicinal. It will comprise, first of all, the correction of two very erroneous habits which prosperous and hard-working men are given to, those of over-indulgence in food and alcoholics and of taking too little exercise. We forget that metabolism is less active and that the body needs less food after development is completed, and that, the play period of life being past, proper oxidation requires more effort on our part; but if well-to-do we easily fall into the habits of luxury, loading our tissues daily with an excess of food materials whose elaboration and oxidation would overtax the average resources; then, inconsistently, we reduce our exercise by riding to our place of daily activity, our leisure hour being spent in reading, in automobiling, or at the club, without exertion on our part. If we indulge in some fashionable form of exercise it is rather as a social pleasure than a necessity, and it suffers many interruptions. In order to the best success it is essential to secure an attitude of mind that will realize that a continuance of usefulness depends upon making a business of proper living, and that is willing to follow that business continuously and indefinitely. In view of the inroads that arterio-sclerosis makes before symptoms occur, we would do well to imitate Nature in her carefulness of the female sex, by instituting a "change of life" in the male at the age of forty or forty-five. At this age the greatest strain of securing a position of usefulness and a sufficient income should be past, so that, except for the greed of fame or of acquisition, a man should be able from now on to work more leisurely and conserve his powers for a longer usefulness.

In the matter of eating, two moderate

meals daily are sufficient if one will habituate himself to the plan. A third meal, if taken at all, should be light and easily digestible. The aim is to take just enough food to supply the actual daily need and no more. An abundance of water should be taken to act as a dilutent and to aid elimination. The daily routine must include enforced active exercise, in order to stimulate general circulation and complete oxidation of food materials and waste products. Walking is undoubtedly the best form of exercise, and it presents very little danger of excess to the person of ordinary strength. Bicycling, gymnastics, and bowling are excellent substitutes, but being more violent they present greater danger of excess. Whatever the form of exercise, it must be with free access of fresh air and it must require expenditure of energy. It is a mistake to suppose that the inactive open-air diversion of automobiling will take the place of exercise. The appetite will be sharpened by any out-of-door life, but if the larger amount of food thus demanded be not burned up by the active expenditure of energy, it will be deposited as fat without advantage. Any marked increase in weight at any time should place an interrogation point as to the proper adjustment of food and exercise. Massage is very useful when the condition prohibits active exercise, but, for the man who can walk, it should be regarded only as an aid.

Referring again to the importance of the capillary circulation, we urge the necessity of studying the condition of the smaller arteries, and particularly the arterioles, as a basis for another equally important line of treatment.

By their function of contraction and dilatation, the arterioles regulate the amount of blood flowing into the capillaries and thereby also the activity of cellular nutrition. This function of regulation is diminished in arterio-sclerosis, with a tendency to undue contraction in cases with deficient oxygenation of the blood—for an excess of carbon dioxid stimulates the arterioles to contraction. Therefore in spite of a high arterial pressure the capillary blood supply may be deficient. In order, then, to conserve nutrition of cells through improvement of this function, attention must be directed to the arterioles. In addition to exercise, which promotes the capillary circulation, the most efficient means of exercising the arterioles in their function of contraction and dilatation is by means of the daily cold bath. The tub or shower bath each morning, or cold sponging or pack as substitutes, will exercise the vessels in both ways; the first contact of the cold water causing a contraction which is quickly followed by a tonic dilatation that imparts a ruddy glow to the surface and gives a sense of refreshment and well-being to be obtained in no other way. Friction with a rough towel should follow in order. The cold bath also stimulates elimination by the kidneys, which adds greatly to its value in these cases. A glass or two of water taken upon arising, followed by the cold bath, will make one sensible in a short time of a very active kidney function.

The circulation can in this way be flushed out in preparation for the needs of the day. Activity of the bowel function should at the same time be secured. If the person is of full habit or if elimination needs aiding, a moderate dose of a saline cathartic each morning upon arising will be in order.

Regarding the cold bath, it is thought by some persons that they cannot accustom themselves to so vigorous treatment, but if the bathing be done in a warm atmosphere, so as to avoid chilliness before the bath, and if the plan is begun with water only slightly cool, reducing the temperature by degrees during weeks of treatment, always securing a good reaction by the aid of friction, nearly every person can become accustomed to a bath of 60° F. Recalling that arterio-sclerosis is a disease characterized by high arterial blood pressure which in time may become a menace to a weakened cerebral vessel, we expect the combination of restricted amount of food, active exercise, and bathing will accomplish a reduction of blood pressure and possibly of cardiac hypertrophy. In advanced cases, where degeneration of the heart has resulted, a more decided dilatation of arterioles is secured by the effervescent brine bath, known as the Schott bath. The excellent results following its use are due to the reduction of work required of the heart by removing the peripheral resistance of contracted arterioles, and to the improvement of nutrition in the cells receiving a better supply of blood.

It is of importance that the man who is working long hours or under constant strain shall lessen the tension and avoid all sources of worry. Shorter working hours and longer out-of-door exercise should be the new rule.

Among the drugs employed in this disease, potassium iodid has the reputation as an alterative of antagonizing the sclerotic process. The nitrites are positive vaso-dilators, but their action is essentially depressant and they have come to be used more as emergency remedies than in routine treatment.

Discussion.

Dr. B. J. CIGRAND, Chicago, Ill. I did not hear all of the paper read, but I had the good fortune to read it through last night, and it was because of that reading you have heard it today. Dr. Long had an appointment to be out of the city today, but I induced him to remain and read this paper. I feel he has given us a message that will mean much to many of us. I consider his labors in this direction of great value to each and every member present, and I am satisfied that when his paper is printed, and time be taken to carefully read and digest what he has given us, everyone will be satisfied in his own mind that it is one of the best papers, so far as the advice given is concerned, that has ever been read before the dental profession. I am satisfied that he has treated the subject in a scientific way, and has based what he has given us on the closest study of the subject. I realize every day that our profession is one of the most taxing. I doubt not that our labors act more severely upon the nervous system and circulatory system than any other labor the human being may engage in. The tedium of putting in a large gold filling, the removal of pulp in a molar tooth, and a great variety of labor that falls to us every day, is of such character as to exhaust the whole system, not merely the physical system, such exhaustion as is felt after running a race, nor the mental system, such as is experienced in studying, but the strain on both systems is such that we are both physically and mentally exhausted. I sometimes think our labor begets a peculiarly tired feeling not yet described in our latest dictionaries. We are all working too hard and too constantly. The doctor has brought

us a message. He says, Stop, rest, recuperate, and live; and every one of us needs that edict given him, and we need some power stronger than ourselves to enforce it. I say to you, gentlemen, that the majority of the young men now practicing dentistry are laboring with more severity and more constancy than did the old practitioners. We are all confined in the office too closely. Our professional work greatly differs from that of the medical, legal, or kindred professions. That for which we receive compensation is done right in our office, and we are supposed to be paid only after we have delivered some form of goods or material. The lawyer and others may go out in the fresh air, and get recreation while doing their work; not so with ourselves. All this should be changed. We should be able to charge for our advice. Every day you are giving advice to your patients and not collecting one penny for it. The only time they care to pay us is when we have given them some metal, some earthly goods, and it belittles us.

Recently a judge in Oregon had the good sense to give a dentist the right to collect a small account of sixty-five dollars for advice he had given. I believe that is the first such verdict we have received in the courts. I believe that if patients come to you for advice, whether you make the appliance or not, they should pay for it. Who would think of going to a lawyer and telling his troubles and getting the lawyer's advice, and then go away saying, "I'll be in next week and make an appointment." I think a dentist should charge for advice just as honestly as a lawyer.

The idea that one never leave the office is a little severe on our profession. I myself believe in leaving the office any day and any time I feel severely tired. I have done this for years, but notify my patients of intended absence. No matter who the appointment is with, I do not believe in my practice ruling me. My health comes first, consequently I do not believe in letting my patients dictate to me what I should do for myself. When we are able to do this, we will hold our own and become a dignified profession.

It does not accrue wholly to ourselves when we rest. I hold that when we go out and seek recreation and rest we are not wholly selfish. If you take a week's rest it will be a good to the community in which you reside and practice. No man can practice dentistry in a careful, thorough way when he is tired, when his nerve energy is sapped out, when he is so thoroughly exhausted from his labors. When one has rested he comes back a new man, with renewed power to do the best for his patient. Such a one has the confidence of the patient, and does a great service to him, because one can operate with less strain on himself, and less on the part of the patient, in consequence of good health. The public will be the beneficiaries, and I welcome the day when we will not always be expected to deliver material goods, but can feel we may charge for advice given, and receive such remuneration in return as will allow us to go out into the woods and commune with nature. "In journeying through life, let us live by the way," is both poetic and sensible. Let us take this message, work less, charge more, and live better.

Dr. N. S. Hoff, Ann Arbor, Mich. I do not feel that I can add much to the subject. This is an exceedingly interesting paper, and I believe a valuable and pertinent contribution. I was interested to note the differentiation made especially in regard to considering

uric acid conditions as a result of auto-infection. I think this is especially valuable information, for it will not only lead us to treat this condition more intelligently and satisfactorily, but will enable us to take better care of ourselves in the line which the last speaker has indicated. I know that we dentists do not take proper care of ourselves, and as the essayist read his paper and as I listened to Dr. Cigrand's remarks, it occurred to me that we are making a mistake in allowing ourselves to get into such a condition that we require such extreme measures to keep our bodies in proper working order.

Recently we have heard a good deal said about the suggestion made by Dr. Osler, that at sixty years of age a man's life is practically ended, and he might as well be chloroformed. I have seen many men whose work should not terminate at that age. If it is true that at the age of forty-five we begin to degenerate, is it not time for us to understand this matter more than we do, and take more care to maintain our bodies in more perfect condition?

Not all of us can adopt the excellent *régime* of exercise prescribed. It is inconvenient, and requires time and self-denial and all that sort of thing. Would it not be much better for us to take some precautions that would render it unnecessary to do this sort of thing in order to keep our bodies in the proper condition? I have believed for a long time that dentists abuse themselves in the matter of eating, as we eat too much for the kind of exercise we have. We must do our work in the house, or in the office, under conditions that we cannot change very easily. We can change our diet, if we cannot secure sufficient oxidation to assimilate the food we provide. Is it not time for us to determine what food we require, its character and the quantity? I have been in the habit, and most of you have, I presume, of eating a hearty dinner in the middle of the day, and I find that I do not return to my work with energy and enthusiasm. I feel more like taking a nap than going to the chair, but my patients will not wait for me. We resume work too soon after eating a hearty meal, and bending over the chair in the positions required by our work, we make it practically impossible for the digestive organs to take care of the meal we have eaten. The food remains in the digestive tract undigested, to undergo fermentation with its toxic result. Is it not possible to change our *régime* to two meals a day at such times as shall provide an opportunity for digesting and assimilating them, rather than at a time when it is impossible for us to do this? It seems to me this should be an easy matter to control.

It may be impracticable for us to change our habits of work, but we can change our habits of living, and it is incumbent upon us all to do so. We have need not only to adopt the method recommended by the essayist for taking care of our bodies after they are in this debilitated condition, but also to secure better ventilation in our offices. Many have offices in large cities, and small operating rooms with a limited amount of fresh air, which should have the air changed frequently. I am very glad to have heard the paper, and as Dr. Cigrand has said, I want time to read it over and to think about it.

Dr. Logan here took the chair.

Dr. J. D. PATTERSON, Kansas City, Mo. I have nothing particular to add to what has been already said. I am convinced of the great importance of all this,

because I have seen so many who have fallen by the wayside on account of too diligent attention to business and too long office hours. It is unquestionably a fact, which he states so succinctly, that it brings about the conditions he refers to in his paper, and we should all take it to heart as a practical lesson. Like many others, I consider myself so strong that nothing can tire me to such an extent as to bring about these conditions; but as the hours, months, and years go on, we find insidious inroads upon the strongest constitution by the methods of living which he has spoken of, and which will, with the best and strongest, bring about disease, unless we compel ourselves to take exercise in pure, fresh air. This we must do, in order to keep up a proper physical condition.

Dr. LONG (closing the discussion). I want to say that my paper had the merit of presenting nothing new, but simply emphasizing some essentials not sufficiently appreciated by professional men. I think of but one point to which I wish to reply, namely, regarding intervals of meals. Of course that should be according to a man's activity. I presume a man working hard at active physical labor cannot well pass the dinner hour without a good meal, but it seems to me very unphysiological for a dentist, physician, or any professional man to eat a heavy meal and return immediately to work. If one will substitute a bowl of soup, a cup of coffee, and possibly a light dessert, he will feel better for it and not have that feeling of indisposition to which Dr. Hoff referred. It seems to me more physiological to take the two solid meals morning and evening, with something like equal intervals of time between.

I desire to express the feeling that it might be of benefit both to medical and dental circles to occasionally interchange our papers. I was much impressed in listening to Dr. Cigrand's paper on mastication. I would be glad if physicians could hear that paper, as they do not concern themselves enough with that subject.

The next order of business was the reading of a paper by Dr. F. W. KNOWLTON, Akron, Ohio, entitled "The Possibilities of Modern Dentistry," as follows:

The Possibilities of Modern Dentistry.

By F. W. KNOWLTON.

THE advance made in recent years through scientific research is stimulating the dental profession along lines whose possibilities would place oral prophylaxis before the world as commanding a place second to none in importance among the many measures which are being promulgated for mutual good. Many in the dental profession see the necessity for this, but the public as yet does not fully realize its importance. Medicine, surgery, dentistry, and sanitation are being practiced along lines as laid down by bacteriologists with far more success than ever before. Yet when we consider the conditions ordinarily existing in the oral cavity, as revealed by this science, is there not good ground for the belief that dentistry is destined to be recognized as of far greater importance to

mankind than has been conceded in the past? It is not the intention to convey the idea that there should be any less stress put on the value of the teeth, or the importance of their care for the sake of the teeth alone, but the profession should endeavor the more to instill into the minds of the public the necessity of a clean healthy mouth, as a requisite to the acquirement and preservation of a sound body.

Were this fact generally known, oral conditions that receive little or no attention would be more fully realized, and with better prospects for results. Unquestionably our civilized modes of life and methods of preparing foods are largely the cause of the increasing prevalence of sordes at the gum line, thus furnishing a suitable pabulum for the development and multiplication of micro-organisms. This results in the deterioration of the environment of the mouth, and necessitates greater vigilance, in order to combat this ever present menace to health and happiness.

As nearly all the diseases of bacterial origin gain entrance through the mouth, these conditions become a means of contagion and a prolific source of chronic disorders of stomach, kidneys, and lungs. Many forms of contagion and infection could be directly and effectually combated by dealing with the mouth-conditions in a practical and systematic manner. The dangers arising through expectoration are universally conceded. Laws bearing on this repulsive practice are in force.

Yet slight precautions are taken, commensurate with the needs, toward meeting mouth-infection—even in cases of that dread disease, tuberculosis. Periodic change of mouth-environment, brought about largely by mechanical expulsion of its contents, and the actual contact of the brush with that vulnerable part, the gum line, thus restoring functional activity of gum tissue, are chief requisites from a hygienic point of view as concerning both personal and public interests.

Several years' experience as dental examiner for the Diamond Match Company has afforded an excellent opportunity for observing conditions of the mouth of a class of people who, through ignorance and neglect, as a rule fail to follow any of the necessary precautions to a sufficient extent to preserve the teeth or to keep the surrounding tissues in a state of comparative health. They do not appreciate that the conditions existing within the mouth are in the least detrimental to their general health. Statistics compiled from my records of the 2000 examinations made every three months, and covering a period of about five years, give 36,906 recorded examinations among males and females, varying in ages from fourteen to fifty years. Of this number 5207 males needed 8675 fillings, 2282 teeth to be extracted, and 441 teeth to be treated; 4269 females needed 7489 fillings, 1019 extractions, and 312 teeth to be treated.

An essential means of precaution to be used to avoid serious trouble makes necessary in my work the placing of many teeth for extraction which might under other circumstances be treated and saved. The girls and women being generally considered as more unfavorable subjects has caused me to go through their records for a period of four and one-half years to January 1905, with the following results:

In 2036 cases the first examination shows that 1299, 64 per cent., needed 3546 fillings, 404 needed 790 extractions,

and 133 needed 153 teeth treated. Among this number of people there was a total, during four and one-half years, of 6628 fillings, 868 extractions, and 253 teeth treated. Out of these 2036, there were 276 who were under surveillance quarterly for the entire four and one-half years; four of these having full upper and lower plates, and fifteen requiring neither fillings, extractions, or teeth treated, or 7 per cent. The 257 (93+ per cent.) remaining, with need for operative dentistry, presented 519 cavities at the first examination, or an average of 2+ to each person; the remaining time there were 1040 fillings inserted, or 1— filling a year for each person. For extractions there were 56 at the first examination, and 32 the remaining time. Of teeth to be treated there were 27 at the first examination, and 32 the remaining period. The number of cavities estimated on first examination are very conservative indeed, while the figures for extracting and treating represent very closely the necessities existing at whatever time the examinations were made. Those who needed ten or more fillings the entire period numbered 62 people, with 793 fillings to their credit. Those needing less than ten fillings numbered 195 people, with 766 fillings. Gum conditions presented with fully as important considerations as those involving the teeth, together with opportunity for demonstrating the degree of effectiveness which simple and rational means afford.

Review of my records, together with knowledge of conditions among the employees who have been under surveillance any considerable length of time, also affords an opportunity of knowing somewhat the results, immediate and far-reaching, consequent to the observance of means looking to comparative cleanliness, as well as the urgent need for adoption of active measures in order that the rising generation be relieved from the consequences entailed through the present system. There is a growing belief that the public schools should be a qualified source of knowledge on all topics pertaining to the welfare of the young. The readiness with which school boards are permitting inspection in other lines should encourage the various dental societies to persist in their efforts with increased vigor, to the end that dental inspection with compulsory oral hygiene be installed in all institutions of learning. Such encouragement of habit, for moral, mental, and physical development, would prove both eminently valuable and practical.

Discussion.

Dr. H. L. WHEELER, New York, N. Y. I notice one place in the gentleman's paper where he spoke of the necessity of extracting something over one hundred and fifty teeth. He neglected to state whether they were deciduous or permanent teeth.

Dr. KNOWLTON. Mostly permanent.

Dr. WHEELER. What was the occasion of extracting such a large number?

Dr. KNOWLTON. Roots were badly abscessed. Such people cannot afford to pay for having the teeth treated successfully in a good many cases.

Dr. WHEELER. I am not prepared to criticize the doctor's position, but if I had one hundred and fifty teeth to extract in five or ten years, I should think I was doing a great deal of damage. It seems to me the first step toward preserving the utility of the mouth is to keep the teeth in place, and if the patient can afford the time, no matter how

badly abscessed, I do not remember having seen for a long time a tooth that could not be made to do service for some little time longer than when the patient presented.

Dr. L. G. NOEL, Nashville, Tenn. I did not hear the title of the paper, but some of it impressed me with the truth of the statement that we do not talk to our patients enough about the importance of oral prophylaxis—the possibility of auto-infection from uncleanliness in the mouth. I believe we overlook the advantages that come to us as dentists, of laying the importance of these matters before our patients, and impressing them with it. I think if we dentists would follow up the opportunities we have when the patient is in the chair, and we are thus able to talk to them, it would redound greatly to our credit, and be a professional advantage.

Dr. KNOWLTON (closing the discussion). I do not know that there is much to say. The number of extractions has been necessary, as I stated in the paper, on account of the nature of my work, more than is ordinarily necessary in practice, as I am dental examiner for the Diamond Match Company, and I examine the mouths of all the employees in that company in all their factories in this country. I do not do any of the work necessary myself.

Dr. WHEELER. The figures were not from your private practice?

Dr. KNOWLTON. I am not in private practice now; I look over all the employees in these factories every two to three months, and keep a record of each case, and necessarily they have to go and have the work done by other dentists. Many of the teeth I mark for extraction might be treated and made good teeth if the dentist would treat them. But if I marked on the slip first to go and have it treated and afterward it was extracted, there would be trouble. I find it necessary to do it the other way. A great many I have marked for extraction have been treated and saved. If you will realize that this is only among thirty-six thousand examinations, you will see it but demonstrates the importance of dentistry, and the high prophylaxis that is being advocated at present. The masses do not get into the dental office. One man says ten per cent.; it is not much more than that, if it be that. My examinations include many pupils out of the public schools on their vacations, and the young are following in the footsteps of their parents.

I want to thank the chairman and those assisting him for the courtesies extended.

On motion the meeting adjourned until 8 P.M.

SECOND DAY—Evening Session.

The meeting was called to order Wednesday evening, July 26, at 8 P.M., by the acting chairman, Dr. W. H. G. Logan.

The first order of business was the reading of a paper by Dr. HERBERT L. WHEELER, New York, N. Y., "Some Observations upon the Obscure Etiology of Pyorrhea Alveolaris," as follows:

Some Observations upon the Obscure Etiology of Pyorrhea Alveolaris.

By HERBERT L. WHEELER.

In observing the various phases of pathological conditions exhibited in the disease which results in the destruction of the supporting alveolar wall of bone about the teeth in the human jaw, it has occurred to the writer that while local treatment is almost always beneficial and often curative, it is not invariably so.

This may be because the underlying causes are not primarily local, but are results of conditions the beginning of which extends back to the dawn of human existence.

From the various forms, such as local irritation caused by a deposit of calculi in a few places up to that condition of calcareous material which occurs well up under the free margin of the gingiva and causes a general irritation, there is produced a variety of pathological conditions. These are the congestion of the soft parts and the disintegration and destruction of the underlying bone, producing waste material that invites the presence and multiplication of pus bacilli, or those disagreeable, infectious, and infected pus pockets known as pyorrhea alveolaris, which are followed by the loosening of the teeth and recession of the gums.

It seems possible that these various steps of disease and destruction may have their origin assigned to the time when primitive man began to experience the vicissitudes of an ever-changing environment. This mutation has finally grown to the conditions of our present high form of civilization.

With this thought as an incentive, I was induced for purposes of comparison to undertake the examination of the jaws and teeth of the large number of prehistoric American and other skulls to be found in the American Museum of Natural History, New York city, and also some in Peabody Museum at Harvard College.

Thus far I have examined carefully more than fifteen hundred skulls, and find conditions that are a surprise to me. I cannot do better than to give you a record as I took it down at the time of examination.

The first lot comprised some ninety-two skulls known as Jaliscos and Huicholes, Mexico; of this number only eleven showed any signs of alveolar destruction such as occur in the cases of pyorrhea alveolaris, and the destruction in most or all the cases was due primarily to an alveolar abscess which had apparently been caused by a diseased pulp. As to accumulation of calculi I shall speak later.

The next lot, from the Cave Valley mines, Chihuahua, Mexico, comprised some fifty-six skulls of which the alveolus of six had been destroyed, this process in each instance being caused, as in the cases before mentioned, by alveolar abscess.

The next lot were more numerous and comprised Chihuahua, Tarahumar, the Valley of Mexico, the Mechoacan Tarasco and Otomie—altogether some two hundred and seventy-two skulls; of these

forty-seven had well-defined marks of alveolar destruction around certain teeth, and in all instances the evidence indicated that they were caused by alveolar abscess.

These are about all the Mexican skulls examined. When I describe them as prehistoric, this means in the sense that they are the remains of a people who inhabited the region from which they came previous to the coming of Europeans. How long they antedate this period is not known.

The next lot were of Peruvians, and were secured and brought to the museum by Professor Bandolier. There were seven hundred and twenty-one of these. One hundred and sixty-six gave evidence of alveolar destruction.

There were many curious abnormalities in these jaws, and conditions which might indicate a more advanced civilization than in the case of the Mexicans, but the general cause of alveolar destruction in these as well as in the others seemed to be abscess conditions.

In the territory now comprised in the United States the most ancient skulls were possibly those from Santa Catalina, southern California. Of these there were fifty-six. Fourteen showed evidence of alveolar destruction, the cause apparently being the same, viz, alveolar abscess. These skulls I found in the Peabody Museum of Harvard University.

Of great age also are the skulls of the Cliff-dwellers of southeastern Utah. There were seventy-two of these, and only four showed any evidence whatever of destruction of the alveolar process, these also being caused by a destroyed pulp and abscess following.

There were a few scattered ones from South America; five Amazonas from Peru; three of which were affected, and four from Patagonia and Tierra del Fuego, one of these four being affected.

From the northwestern portion of the United States and British Columbia there were a large number—one hundred and sixty-two, of which fifty-nine showed destruction of the alveolar process, and these cases were largely due to alveolar abscess; but in some cases syphilitic lesions seem to have been the cause.

From the southwestern portion of the United States there were skulls of the Pueblos of New Mexico, of which I examined twenty-one, only three of which showed any destruction of the process.

From White River, Arizona, there were the skulls of some Apaches, Anatobes, etc., eight in number, two of which showed destruction of the alveolar process. From the general appearance I think that both these and the skulls from the northwest are of a later date than the Mexican, Peruvian, Santa Catalina, and southeastern Utah skulls.

From Siberia there were sixty-six Eskimo skulls examined, and twenty of these showed destruction of the alveolar process.

There were fifty-seven unclassified skulls, twenty-five of which showed the process more or less affected. Whether these latter skulls were modern or ancient I do not know.

Now, the thing that surprised me most was to find calcic deposit about the necks of the teeth in a large majority of cases, but rarely had it produced much effect except to cause a slight receding of the alveolar border and a slight thickening of the bone.

With the exception of a very few cases in these fifteen hundred skulls the destruction of the process in any such way as the disease of pyorrhea is known to destroy it was plainly due to alveolar

abscess caused by pulp trouble, and this was to be found almost universally in those of advanced years and came about in this manner: The teeth gradually became worn down owing to the harshness of and the grit in the meal and cereals used by these people, this food material being probably ground by the primitive method between stones; and finally, after the wear had become so great that for some reason the pulp was no longer able to protect itself from irritation and infection, it succumbed to the inevitable, decomposed, and caused an abscess which usually resulted in a greater or less destruction of the alveolar plate in the vicinity of the disease.

It was remarkable, though, how the tendency of the pulp, in these people of long ago, was to protect itself; the common condition is to find whole sets of teeth with the pulp-cavity well defined owing to deposition of secondary dentin.

If you will notice, the proportion of those that suffer from destruction of alveolar tissue is greater as the remains represent more modern times.

Pyorrhea alveolaris is such a misleading term that I hesitate to use it, as it implies a pus condition which is by no means always present during the destructive process; and interstitial gingivitis is quite as misleading, as it implies an inflammation of the gingiva between the teeth, which is not always present.

Some of the most obstinate and incurable cases that I have ever treated did not have pus in quantities large enough to discover it, and instead of there being an inflammation the condition was anemic, even the gingival margins being almost white; but the teeth were loose and the supporting process was undergoing rapid disintegration.

As the term pyorrhea alveolaris is the one most generally understood I shall use that term, and by it designate those conditions in which the destruction of the alveolar process is taking place, either in isolated places or over the whole surface, regardless of whether there are pus conditions or not.

It is apparent to one who has observed this condition carefully that what occurs in the progress of the disease is not primarily a receding of the gums, as is universally inferred from the language used in describing this condition, but the destruction in some way of the underlying alveolar plate of bone; and the settling down of the soft tissues, as their support is withdrawn through the loss of the bone underneath, causes the apparent recession.

Now, just what takes place in this destructive process I do not know, and I know of no one who has satisfactorily described it. It seems to me, though, that there are underlying reasons why this disease is becoming more and more common, and my observations upon the skulls I have described have suggested to me some things that I have not found mentioned by other writers.

It is now generally conceded that the progress of the human race from the simpler to the more complex form of living is marked by progressive modifications and differentiations, so that as the changed conditions or environments occur, certain organs may become less and less used and others may be used to an exaggerated degree. Now, the organs not used are gradually suppressed or atrophied, while those that are becoming more useful are developed in an increased degree. This is due to inheritance and the propagation of those peculiarities

that contribute most to continued life in the struggle for existence.

The human race is just as subservient to these laws of evolution as any other animal, and the environment of man and conditions under which he exists have changed more rapidly than those of any other animal, owing to his having arrived at a state where he has succeeded in recording his experiences and transmitting information for the benefit of generations to come.

This has resulted in a desire on his part to give more time to the development of the mental and less to the acquisition of aids to merely physical existence. This means decreased physical energy in some ways and parts, especially in the matter of mastication, while increased knowledge has been used to help in the preliminary preparation of food for purposes of nourishment. Thus it is the kitchen and its equipments have softened the fibrous and tough meat used by primitive man and rendered more pulpy the starchy cereals, and nature, ever trying to adjust herself to circumstances, refrains from producing the energy originally necessary to accomplish by mastication what is now done mechanically and chemically.

This, I apprehend, is the reason why the calcareous matter deposited upon the teeth of ancient man was less destructive than at present. The food of those times was hard, tough, and fibrous, and required time and energy to prepare it for swallowing. Now, through the assistance of the culinary department and of proprietary and special forms of manufacture—as is evidenced by the great variety of breakfast foods—there is not material taken into the mouth to continue the stimulating and toning effect that the mechanical friction of fibrous and hard foods produced, and the tissues have lost their tone; and thus, those conditions under which the alveolar process was developed not continuing to obtain, the process of elimination is gradually asserting itself. This, then, is the condition we have to combat, but do not imagine an abrupt return to remote conditions would necessarily remedy the difficulty. Much modification has taken place since the cook-stove was originally used, and we should find an immediate return to early conditions as disastrous as the present apparent developing of a condition in which the human teeth will no longer be needed.

Of course there are details in the progress of this disease which are to be considered. The unnecessary extraction of teeth may bring an extra strain upon tissues already weakened by comparative disuse, and so cause a predisposition to the trouble. People may—in addition to their inability to supply fibrous matter in order that there may be friction in the masticating process—neglect to make some small amends by the judicious use of the tooth-brush on both teeth and gums. Bacilli may contribute to the trouble, but as micro-organisms have existed from the beginning, and as the price of the continued existence of a species is adaptation to its surroundings, I believe that under ordinary circumstances bacilli are harmless and are incapable of gaining a foothold until the vitality of a part by abuse or lack of use is so lowered that the ordinary resisting powers do not obtain. This does not apply to calcified tissues, and it seems to me that the highly accelerated rate of change in our environment, prohibiting nature from adjusting herself to the new conditions is very largely responsible for the large increase in the troubles known

as gouty and rheumatic, which are largely due to faulty metabolism.

This does not necessarily mean that the trouble is entirely local and caused by lack of the severe conditions under which these tissues were developed, for an inability to properly utilize and assimilate food in the stomach and intestines may also bring about conditions that contribute to the early destruction of an organ that is in the process of being rendered useless by lack of use, so that while the final destruction of the alveolar process may be a thing that threatens us, a faulty condition of nourishment may greatly accelerate this undesirable climax. Under the circumstances it would seem that if the conditions in the mouth could be kept similar to those conditions under which the hard and soft tissues have developed in the formative process, the ravages of not only pyorrhea but caries of the teeth would be greatly retarded.

Discussion.

Dr. C. O. KIMBALL, New York, N.Y. To discuss this subject properly requires much preliminary study, and few of us have had the opportunity of looking over these thousand or more skulls which Dr. Wheeler has investigated. In his conclusions he says that pyorrhea depends upon the destruction of the alveolus. It seems to me that this destruction in the case of pyorrhea is along radical lines, starting at one point of the gum margin. It does not tend as a rule to follow around the tooth, but it proceeds in more or less direct lines to the apex of the root. Frequently underneath the gum there is a deep pocket, where the pericemental membrane has been disturbed, absorbed, and destroyed, the attachment of the tooth being of course gone; but it is not my observation that the alveolus is gone. What evidence did Dr. Wheeler find in these skulls which led him to differentiate so clearly between pyorrhea and abscess?

Dr. F. L. FOSSUME, New York, N.Y. I regret very much that I did not come in time to hear all of this paper, which I have been waiting for. The obscure etiology of pyorrhea alveolaris is a subject which, if we study more carefully into the condition of the general health of the patient, as Dr. Wheeler has so clearly made us understand, would become clear, and we should be better fitted to treat cases coming under our care. The etiology of these true cases of pyorrhea alveolaris is really very obscure and deep-seated, and I believe of many years' standing. For this reason it is necessary to find the ways in which the patient has violated the laws of hygiene or nutrition. I have known cases where a cure of pyorrhea alveolaris has been made merely through a change of diet and change of living. I have in mind a lady who was feeding on carbohydrates, or an excessive amount of carbonaceous foods in excess of nitrates, which I believe was possibly the cause of the condition of the mouth. It depends on the vitality of the gums and parts about the teeth and their roots. This patient's diet was changed from white to whole wheat bread, and deprived of buckwheat cakes and syrup, more wholesome and concentrated foods were given, such as nuts and the whole wheat, which can be easily obtained. After three years of careful attention to diet there is no indication of pyorrhea in this patient's mouth, the teeth being firm, the gums hard and tight, and the health improved so greatly that instead of going abroad every year, as previously, the patient is living in New York today and engaged in

business, although past sixty years of age. As said before it is necessary to look back into the patient's life to treat a case of pyorrhea alveolaris. I believe it is often found that some one of the internal vital organs, as the kidneys, the heart and the corresponding circulation, is the true cause of the trouble, and for these causes specific treatment should be applied in conjunction with the medical practitioner. In many cases we can diagnose the first stages of Bright's disease and diabetes from the condition of the mouth, and the patient has been put on a careful diet, flushing the colon and drinking large quantities of pure spring water, excluding the red meats and heavy foods in order to improve them physically; thus the condition of pyorrhea alveolaris has been done away with, of course in conjunction with local treatment. I think we should all be grateful to Dr. Wheeler for the magnificent exhibition which he has given us, and for the benefit we will derive from his researches.

Dr. M. ALBRECHT, Indianapolis, Ind. I think in the future we will have fewer cases of pyorrhea alveolaris than we have had in the past, because more cases are presented to the dentist for treatment than there were twenty-five years ago. The dentists know something about the teeth, and about the best thing we do know is that "cleanliness is next to godliness." We should take care of the incipient stage—the beginning of pyorrhea. Cleanliness is not practiced as much as I would like to see it, and this I know from personal experience, as patients come to me that have been to other dentists, and I find these calcareous deposits permitted to remain around the tooth, the result of neglect on the part of those dentists. The cases which are most desperate are the long-standing ones which have taken ten years or more to develop. I think they will grow fewer in number in the future. We now have about forty thousand dentists in the United States, and I believe cleanliness will be observed more in proportion as the public becomes better educated by the profession.

Dr. WHEELER. I did not intend to infer that the first symptom of the pyorrheal condition was the destruction horizontally of the alveolus as it surrounds the tooth. I am glad Dr. Kimball called attention to the fact that I had not made that claim. In nearly all cases the destruction of the bone is perpendicular in a narrow and circumscribed space, which is the chief way I had of discriminating between true pyorrheal destruction and that brought about by alveolar abscess, in the skulls I examined. The ends of the roots showed plainly that they had been bathed in pus. The parts surrounding had round holes in the outer plates of the bone and were little destroyed at the margin, which was evidence that it was not pyorrhea, but that it came from destruction of the pulp of the tooth. It is not impossible to my mind that the peridental membrane may be destroyed first. It may occur under the margin, but the bone begins to disintegrate, which would account for the condition Dr. Kimball speaks of. I think there are more explanations of this disease than we have any idea of. I do not believe it always occurs along the same identical lines.

Dr. J. P. CORLEY, Greensboro, Ala. We see a destruction where the gingival margin is intact, the part that surrounds the cervical aspect of the tooth, whose function it is to keep the tooth-neck clean from deposits. Is it ever the case that we have an actual sloughing of the alveolus

before the complete destruction at the immediate point of this gingival margin?

Dr. WHEELER. What makes you think you have a sloughing?

Dr. CORLEY. By its evident dissolution.

Dr. WHEELER. Probably not, although you may have. My observation would lead one to think you have sloughing on one side and it remains comparatively clean on the other. The gingival margin that immediately surrounds the tooth may be seriously affected, but not necessarily destroyed.

The paper by Dr. A. L. MIDGLEY, Providence, R. I., entitled "Infectious Diseases of the Mouth," read in Section I, is here transferred to its proper section —Section III. The paper was as follows:

Infectious Diseases of the Mouth.

By A. L. MIDGLEY.

CONTRIBUTIONS to medical journals having direct bearing upon dental and oral surgery are constantly appearing, and since it is generally accepted that the conditions of the mouth and teeth are important factors to be considered in the diagnosis and prognosis of many diseases, our science is daily becoming recognized more and more as a specialty of medicine, and the old idea that the field of dental surgery was merely the mechanical cleaning and filling of teeth has been discarded.

At the present time it is imperative for the dentist to have a profound knowledge of infectious diseases; thus he may be of invaluable service to the patient afflicted, protect other patients, guard against infection himself, and be of aid to the general practitioner of medicine. It is not within our province to treat constitutionally certain diseases—syphilis, cancer, diphtheria, etc.—but since we are not infrequently in a position to be the first to recognize these and other diseases in their incipience, it is clearly shown that a more minute knowledge of oral pathology and therapeutics is essential to the modern dentist.

Professional spirit is broadening, and with it dental and oral surgery, and since the standard of our profession is measured by our results, and since many of these results are obtained through a thorough knowledge of, and ability to recognize infectious lesions in their early stages, we may be of service, and can do much to place our science on a higher and broader plane.

The most important of all diseases to us is *syphilis,* which appears in two well-marked forms, acquired and hereditary. It is of interest to us not only on account of the virulence of the syphilitic poison, but also because of the ruin it may bring to us or our innocent patients through our neglect or ignorance to determine the character of any of its lesions. Manifestations of the primary, secondary, and tertiary stages of the acquired form, and also those of hereditary syphilis, may appear in or about the tissues of the mouth.

The only lesion of the first stage, the

chancre, begins as a small, round, well-marked, excoriated spot with its edges raised and its center depressed, and is accompanied with inflammation of the ganglia in direct relation to the seat of the disease affected. Usually there is great variation in the size of extra-genital chancres. We may find them small and insignificant, then again deep and destructive looking. A few facts worthy of interest, and which may serve to impress the importance of this subject upon our minds are, that thirty-two per cent. of extra-genital chancres have been found about the tissues of the mouth and lips; that thirty-five per cent. of chancres of the finger are among dental and oral surgeons, and that the lips are the most frequent seat of extra-genital infection.

Pathological appearances of the secondary stage of the disease which concern us are mucous patches and condylomata. This term is a name given to mucous patches that have reached a large size, due to enormous cell-proliferation. Mucous patches are flat or slightly elevated, and vary in color from a grayish pink to a reddish brown, and in size from an eighth to a half inch in diameter. They begin as small round or oval spots; discharge a foul-smelling secretion which is highly contagious, and are found most commonly upon the mucous membrane of the cheek on a line with the occlusion of the teeth, at the angle, and upon the roof of the mouth, and also upon the tongue, fauces, and tonsils. They flourish exceedingly well on parts subject to irritation. Condylomata are large mucous patches with steep, well-defined borders, of a rosy red or grayish color, and like mucous patches, secrete a sticky, foul-smelling matter.

It is necessary, especially in the treatment of these secondary lesions, that the mouth be kept in a clean, hygienic condition—for they are aggravated, if not caused, by a poor state of dentition and the presence of tartar.

The third stage of the disease is characterized by lesions of bone and the deeper structures, but, with a better knowledge of the disease and improved methods of treatment, these lesions are not as commonly seen as formerly. We may meet with necrosis of bone, generally of the hard palate, which is very insidious, and usually appears in the median line. Syphilitic gumma of the tongue also is typical of this stage of the disease, but occurs very rarely.

Hereditary syphilis closely resembles the acquired form of the disease, but in this form the chancre does not appear. Snuffles is a prominent feature in the newborn, and is due to a thickening of the nasal mucous membrane. The child is emaciated, the skin is wrinkled and appears too large for the skeleton, and the face has a worried, anxious expression, resembling very much that of a little old man. Mucous patches and condylomata are found on the mucous membranes and on parts subject to irritation. They are round or irregular in outline, of a grayish or dark red color, and their secretion is very virulent.

In hereditary syphilis the permanent teeth are very characteristic, and considered by most writers decidedly diagnostic of the disease. Hutchinson, who first described them, says: "If the patient is of age to show them, they are most important landmarks of hereditary syphilis."

There is nothing pathognomonic of syphilis in the deciduous set. There is, however, a marked tendency to caries. In the permanent set the upper central incisors are the most typical. They are

usually of a dark color, narrow, peg-shaped, with their cutting edges notched in the form of a crescent and their corners rounded. The horizontal furrows and grooves so commonly met with have probably nothing to do with syphilis, but are no doubt the result of some one of the acute infectious diseases of infancy and early childhood.

Cancer of the lip, tongue, or any other part of the oral cavity may come under our observation. Cancer of the tongue usually appears upon the side of that organ, while the initial lesion of syphilis is more apt to appear upon the dorsum of the tongue. The age of the patient, early involvement of the ganglia, and the seat of the lesion, may aid us in establishing a differential diagnosis. The resemblance between cancer of the tongue and tertiary syphilis is very striking, and it is almost impossible to distinguish between the two without the use of anti-syphilitic remedies. Affections of secondary syphilis would seldom, if ever, be likely to be mistaken for cancer.

Aside from syphilis, tuberculosis, and cancer, diseased conditions of the mouth are found more frequently and in a larger variety in infancy and childhood, than in any other period of life. In early infancy the function of the salivary glands is undeveloped, and this no doubt is the cause of much of the irritation which produces a fertile field for pyogenic and other micro-organisms. Later in childhood the etiological factors are bacteria, but here again many of these diseases are characterized by mouth-lesions which accompany or are secondary to the disease.

Since most of the acute infectious and non-infectious diseases of childhood are accompanied by some form of stomatitis, and since we all know how much the comfort and health of patients suffering from these diseases is increased if the mucous membrane of the mouth be kept in a clean, hygienic condition, it is essential that we be familiar with at least the oral pathology and therapeutics of these diseases.

Gangrenous stomatitis, which always develops in children, and in ninety per cent. of cases terminates fatally, is a destructive, ulcerative disease of the mouth. It begins usually upon the mucous membrane of the gum or cheek, or at the angle of the mouth, and advancing rapidly destroys both hard and soft tissue. It is a secondary disease, and follows measles, scarlatina, or other of the exanthematous diseases of childhood. The cause of it is unknown, but some writers attribute it to a thread-like bacillus.

Upon examination an ashy gray ulcer may be seen upon the mucous membrane of the gum or cheek, which soon turns dark and leaves a coal-black slough. The cheek is swollen, tense, and shiny, and the skin, which is red, turns blue and finally black as the process advances. Other symptoms are high temperature, coated tongue, increased flow of saliva, and drooling.

The curative treatment lies in an early diagnosis and a radical operation. Many use the Paquelin cautery and ninety-five per cent. carbolic acid very freely. Some advocate potassium chlorate internally and as a mouth-wash. Spontaneous recoveries have been recorded, but when they do take place there is usually great destruction of tissue and a frightful deformity with impaired function of the jaws.

As a rule, patients suffering from *diphtheria* are sufficiently sick to be con-

fined to their bed, but in some cases they may be up and around so that the diphtheritic patches come under our observation. They resemble very closely the mucous patches of the secondary stage of syphilis. Upon examination the fauces may be found to be reddened, and later on a grayish white pseudo-membrane appears, first upon the tonsils and then upon the soft palate and uvula. This membrane is adherent to the mucous membrane, and later becomes brownish or yellowish in color. In addition to these lesions the cervical glands become swollen and the tonsils enlarged.

Varicella, or chicken-pox, is a highly infectious disease of the early and middle years of childhood, and is important to us because of its contagious character, for children may be up and about with the disease in progress. It shows itself in the form of an efflorescence, and may appear first in the throat or mouth, but it is not so often first found in this location as is the case with scarlet fever or measles. The characteristic lesion is a vesicle which passes through the stages of a macule and papule very quickly. The vesicle is often surrounded by a light red areola, but we do not find this areola present with all of its lesions. They are soft to the touch, and their contents rarely become pustular.

Measles is an acute infectious disease, generally making its first appearance in the throat, where the condition is very similar to the efflorescence that later appears on the skin. The lesions are very prominent upon the soft and hard palates, and appear as macules or papules of a dark red color, which may turn to a purplish red. Often these papules are found to have coalesced in some parts of the fauces, with the mucous membrane between the lesions comparatively normal in color.

The first manifestations of *scarlet fever* appear upon the mucous membrane of the throat and hard and soft palates. It is represented by an erythema covered thickly with minute macules, which are darker than the accompanying hyperemia. The efflorescence is very much like that seen upon the skin, except that the small white spots do not appear upon the inflamed mucous membrane. Later the tongue becomes reddened and its papillæ prominent, giving rise to what is known as the "strawberry tongue." In some cases there may be an exudation affecting the mucous membrane of the entire buccal cavity and throat, evidently caused by pyogenic organisms.

Stomatitis herpetica. In this disease various micro-organisms are present, but no cause, either local or general, has been found. It does not appear to be contagious nor connected with dentition, although it is commonly found during the dental period. It usually occurs alone, but may be associated with other diseases.

In addition to the reddened, swollen, catarrhal condition of the mucous membrane, small spots of different sizes and of a white or grayish white color appear upon the inner surface of the lip, on the side and under surface of the tongue, and also upon the gums. These lesions develop very rapidly from a macule into what is supposed to be a vesicle, of a glistening grayish color and surrounded by a red areola. There may be a few scattering lesions or they may appear in such large numbers as to simulate a false membrane. Other symptoms are pain, fever, profuse saliva, and drooling. The saliva is never fetid unless the disease is

accompanied with some other form of stomatitis. The drooling saliva often irritates the skin of the chin and neck to such an extent that an eczematous condition results.

The prognosis is very favorable, for the disease appears to be self-limited. In the treatment an astringent, antiseptic mouth-wash is desirable, and if the lesions do not heal readily it is well to touch them with silver nitrate. In this form of stomatitis potassium chlorate is not indicated.

Stomatitis ulcerosa is a pathological condition of the mucous membrane of the mouth, and affects the gums around the teeth. It may appear in the course of a number of diseases, and may also be caused by the internal administration of arsenic, lead, mercury, and other mineral poisons. Occasionally it may occur as a local affection, with no known cause. The most common form of stomatitis ulcerosa is that caused by mercury.

At the gingival margin the gum becomes reddened and swollen, and the normal curve of the gum becomes a straight line, covering the cervical border of the tooth. The mucous membrane assumes a purplish color, and owing to the flabby condition of the gum hemorrhage takes place upon the slightest pressure. Ordinarily the labial and buccal gingival mucous membranes are affected, but in severe cases the lingual gum only is involved. As the process advances the gums loosen from the necks of the teeth and a foul secretion is found between them and the teeth. Later a yellowish line appears upon the swollen gum. This line is at first narrow, but may become broader and involve most of the gum. The process may continue, attacking the periosteum and producing necrosis of the bone.

A differential diagnosis is not difficult to establish, for there is no other disease characterized by the purplish color and the soft, swollen condition of the gum.

The prognosis is favorable, and in the treatment, if a mineral poison is being used, it should be discontinued. Potassium chlorate internally and as a mouth-wash is very beneficial. Care should be taken in administering this drug, however, for in some children it acts as a poison, causing drowsiness, depression of the heart, suppression of urine, and even cyanosis. If the patient should be thus affected by the drug, I use a saturated solution of boric acid, with good results.

The disease called *thrush* is a local one, caused by a fungus which grows upon the mucous membrane of the mouth of infants and young children. It may be seen in the mouths of healthy children, but is more likely to appear in the weak, anemic type. The growth begins in one or more small spots, and at times the entire mucous membrane may be covered by it.

The fungus closely resembles a mass of curdled milk in appearance, but is more gray in color. It does not look like a membranous exudation but appears as elevated patches upon the membrane. It develops generally upon the inner surface of the lip, on the gum, tongue, hard and soft palates, and pharynx, and may even extend into the esophagus. The diagnosis of this disturbance is not difficult, for if we find merely a mass of curdled milk it is easily wiped away, while the fungus is very difficult to remove.

The treatment lies in the local care of the mouth. Constant removal of the growth and rubbing the parts with a non-irritating antiseptic wash is advocated, and perfect asepsis and hygienic meas-

ures are necessary, that reinfection may not take place.

For the welfare of our other patients, it is well to regard all patients—rich and poor—as infectious, and when we find any indolent ulcer in the mouth, to bear in mind the importance of early recognition and diagnosis.

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Adjourned *sine die*.

THE CLINICS.

Porcelain.

Dr. N. A. STANLEY, New Bedford, Mass. "An Easily Constructed Porcelain Crown for Molars."

In giving a description of the different steps incident to the construction of this crown, I do not pretend to describe anything new or original. I first used it for broken-down molars the seat of abscesses, which after being properly treated make solid foundations for crowns.

Of course the first step is to carefully treat the roots, then fill the pulp-chamber, restoring any decayed portion with amalgam. When nicely finished below the gum line there will be nothing to irritate the tissues, one of the essential requirements in all crown work. After the amalgam has hardened and been trimmed even with or a little below the gum line, proceed as follows: Drill two or three parallel holes wherever best to do so, an eighth of an inch or so in depth, large enough to receive No. 18 gage platinum wires. To this surface burnish a piece of platinum plate of No. 32 or 33 gage. The pressure of a small ball burnisher will indicate the position of the holes. Put the wires through the plate and solder them with pure gold. I usually solder one at a time, and it assists in obtaining accurate relationship of the wires and holes.

FIG. 1.

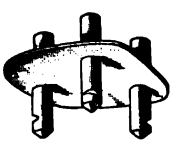


FIG. 2.

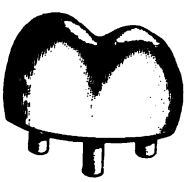
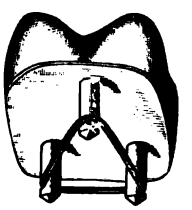


FIG. 3.



The length of the pins on the occlusal side will be determined by the nature of the bite.

After the pins are in position further burnishing and malleting will indicate the exact size of root-surface on the under side of the platinum. Trim accurately to this line and bring to a knife edge (Fig. 1). Place in position and take an impression and bite at the same time with plaster. From this impression accurate working models are obtained. A thin coating of wax on the pins enables one to remove them from the

model easily. The body is now applied and biscuited, and after it has been carved to more accurate proportions is ready for the enameling (Fig. 2), although before doing this it is well to wind a piece of small platinum wire around the ends of the pins (Fig. 3), as in baking the contraction of the body will cause these ends to spread. Pure platinum should be used, as the pins can be readily bent if necessary. The little wire will prevent much change. As there is considerable shrinkage it may be necessary to add a little body or enamel several times before a perfect result is obtained.

My experience for crown work has been confined to Parker's high-fusing body, whenever I have done my own carving. I have no doubt, however, that the different makes are all good for this work.

Dr. J. Q. Byram, Indianapolis, Ind. "Fusing Porcelain."

Dr. Byram gave a clinic on the fusing of porcelain, especially with reference to the results obtained by the use of the pyrometer furnace. He demonstrated the necessity of slowly fusing porcelain by showing the injurious effect of rapid fusing. Under-fused porcelain is granular and opaque in appearance, while over-fused porcelain presents a glass-like surface and is much lighter in color.

Dr. J. F. Ross, Toronto, Ont. "Restoring Gum Tissue with Porcelain Gum Enamel."

Dr. Ross's clinic consisted of the insertion of a porcelain filling in the labio-gingival surface of a canine, restoring an area of receded gum tissue with porcelain gum enamel. The filling was prepared upon a platinum matrix with Close's body of a shade to match the color of the tooth, and Close's "gum enamel" was used to restore the gum line. The tooth body was first applied in its proper place in the matrix and after removing the excess of moisture, the gum enamel was applied, again removing the excess of moisture. The operator proceeded in this manner until the filling was completed.

Dr. M. C. Tracy, New York, N. Y. "Novelties in Porcelain Crowns and Removable Rubber Pieces."

(1.) A banded bicuspid with the band extending below the floor in the palatal region. The root is prepared as for a Richmond crown, being scaled clean and smooth, so that the outer circumference of the band will equal only the circumference of the root. The labial portion of the root is beveled slightly below the gum margin.

Prepare a post to fit the enlarged root-canal and insert it through a disk of 31-gage platinum cut approximately to fit the end of the root; remove, and solder with platinum solder. Replace and burnish to the very edge of the root, then remove and trim it until the edges are flush with the root. Fit and press the band into position over the floor and the root. At this time paint the joint where the floor comes in contact with the band with a soldering flux. The whole is then removed in an impression of sand and plaster, and soldered. On removing from the investment, that portion of the band below the floor is trimmed, beveled, or rounded from the palatal portion of the labial, where it graduates flush with the floor of the cap. At this point the outer

surface of the band is polished, and the inner surface is roughened for the attachment of the porcelain.

After placing the cap in position, a final impression and bite is taken and the facing ground into position, the pins being soldered to the post extending below the floor. There remains the filling-in of this cup-shaped cavity with continuous-gum porcelain, and building up the inner cusp and contour. The last one or two bakings can be done in low-fusing porcelain.

(2.) In the case of the canine, the root is beveled from the center lingually and labially, leaving a narrow horizontal floor in the center of the root. This floor is beveled slightly at the approximal edges; an impression is then taken and 30-gage platinum swaged, which will approximately fit the prepared root. A small obtuse-angle tray constructed of German silver can be used in taking this impression. After fitting and soldering the post, the platinum is burnished or malleted to make an absolute joint.

The final impression and bite is now taken, and after waxing the post, the cast on which to construct the crown is poured. The facing is ground in, and the pins are soldered to the post, as in the previous case. At this point the crown can be tried in, or from time to time as the porcelain is being added. The finishing is done as in the case of the crown previously described.

(3.) For a bicuspid the process of construction is practically the same as for the canine, only requiring some skill in building up the inner cusp. The virtue of crowns constructed in this manner consists, first, in the comparative inconvenience to the patient in preparing the root; second, the doing away with the band, which in so many cases causes recession of the gum and becomes unsightly; third, the strength of the seat formed by the many angles.

Crowns Nos. 2 and 3 in my practice have taken the place of the Richmond or the banded porcelain crown, in almost every instance.

(4.) The porcelain molar without a band can be used in some cases very successfully and can be constructed with very little inconvenience to the patient. The tooth is cut down even with the gum, or slightly under the gum; then with large round burs or stones, the root is beveled from the periphery toward the center, graduating into the pulp-chamber. The pulp-chamber is then temporarily filled with gutta-percha, and an impression of the root is taken upon which to swage the floor, or foundation. This done, the gutta-percha is removed and the post or posts are fitted and soldered as in the previous cases.

After taking the impression and bite and pouring the cast, a facing or saddle-back tooth is selected and ground into position, and the pins are soldered to one or more of the posts. The crown is then built up with continuous-gum body and is finished with a low-fusing porcelain. The crown can be built up from the beginning with continuous-gum body, but I believe will be stronger if the facing or a portion of one is used as the foundation. If the bite permit it, the saddle-back tooth can be used with satisfactory results.

To make a removable rubber piece, the clasps are fitted on a metal die and swaged in a shot swager. Spurs or lugs of pure gold are swaged in the most convenient fissures and stiffened with 22-k. solder. The clasps are attached with a stiff iridio-platinum wire. This forms the frame for the vulcanite.

Dr. G. T. BANZET, Chicago, Ill. "Porcelain Inlay."

Dr. Banzet's clinic consisted in the insertion of a porcelain inlay in an upper left lateral incisor; the restoration involved approximately one-third of the tooth mesio-distally, and extended about two millimeters below the gum margin.

Dr. F. W. Low, Buffalo, N. Y. "Method of Building, with Jenkins' Prosthetic Porcelain an All-porcelain Crown, Adaptable to the Root of Any Tooth, but Especially Available Where the Teeth are Broken Down to the Point that the Adjustment of a Band Becomes Painful and Difficult."

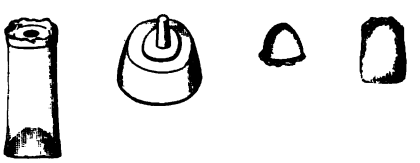
Procedure: (Step One.) Grind the tooth until the end of the root is well under the gum margin, so that the joint between the crown and the root will not be visible after the operation is completed and the tissues about the root have healed. Prepare the root-canal and cement into it a platinoid screw post of the largest size that the root will properly carry, cutting off the protruding end of the post to such a length as the bite will indicate in order to provide space for a sufficient amount of body in that portion of the crown where the stress of mastication would be most apt to break it, bearing in mind that it is not essential that the end of the screw post should protrude to any great length.

(Step Two.) Out of any thin metal, such as platinoid or German silver, make a small cornucopia. Fill this to overflowing with "dentallac" and press it while warm over the end of the root while the post is in position, and thus obtain an accurate impression of the surface of the root to be crowned. (Fig. 1.)

(Step Three.) Into the hole made by the platinoid pin in the dentallac impression, fit a short wooden or metal peg; mix cement as for a filling, model it around the end of the dentallac impression, and when the cement has hardened separate it, and a model representing the end of the tooth with the platinoid pin in it will be the result. (Fig. 2.)

(Step Four.) On to the cement model burnish a gold matrix. Remove the matrix and invest it in powdered asbestos. Dry out the investment and fuse upon it

FIG. 1. FIG. 2. FIG. 3. FIG. 4.



in the furnace a small conical button made of Jenkins' prosthetic porcelain. (Fig. 3.)

(Step Five.) Place this conical button on the root of the tooth in the patient's mouth and secure a small mush-bite in plaster; then from this impression make models of both jaws, and proceed to build up the crown upon this foundation button until the length, breadth, and bite accommodation are correct, using the plaster models as guide. (Fig. 4.)

(Step Six.) Fit the finished crown, made with the Jenkins prosthetic porcelain, in the mouth, and if found satisfactory both in color and shape, strip off the gold, etch, and cement permanently. (For this purpose I use Ames' special inlay cement.)

I have made between thirty and forty of these crowns, and the results so far have been satisfactory in all cases.

Dr. G. B. MITCHELL, Buffalo, N. Y. "A Rapid and Accurate Method of Porcelain Obturation without a Matrix."

Dr. E. B. SPAULDING, Detroit, Mich. "Reproducing the Entire Natural Enamel with Porcelain."

Dr. T. C. TRIGGER, St. Thomas, Ontario, Canada. "Metallic Shell Inlays."

Gold inlays have been greatly used in the case of very large cavities in bicuspids and molars the walls of which are too frail to support ordinary gold fillings, although they are applicable to almost any cavity, except very shallow ones which will not permit of sufficient anchorage. They have been widely used in dental practice, and are considered, beyond doubt, one of the greatest factors in preserving tooth-structure. Their insertion prevents, to a great extent, the vast destruction of the enamel necessary when gold crowns are used, and the recurrence of decay in large cavities filled with amalgam.

In preparing a cavity for an inlay there are several requisites. (1) The cavity should be thoroughly prepared; (2) The cavity must possess such depth as will admit of good anchorage. (3) The matrix must be easily adapted to the margin of the cavity. (4) Thorough access must be had for its insertion. (5) There must be good retention. We use the term shell inlay for the reason that when the inlay is inverted it resembles an ordinary shell.

First cleanse the cavity of all decay, then proceed to trim the edges. In cutting the margins remove any overhanging portions, in order to secure throughout a uniform line. Angles must be cut away and converted into curves, and straight lines must not terminate too abruptly in short curvatures. Cut the edges straight and avoid beveling.

In describing the making of a shell inlay, I shall take a large cavity involving the mesio-occlusal surface of a molar.

After the edges have been thoroughly prepared (Fig. 1), make a cement core for the adaptation of the matrix. Fellowship cement is preferred, as it can be adapted without any difficulty. After it has been thoroughly mixed to the consist-

FIG. 1.

FIG. 2.

ence of stiff paste, apply it to the base of the cavity, filling up the latter nearly to the margins and across its entire floor. In this way a fairly well constructed core will be obtained. In addition, with carving instruments the core can be so cut that a ledge will be made of a few lines in width between the core and the margin of the cavity. Fig. 2 shows the core in position ready for the swaging of the matrix. The use of an intervening substance of this kind will prevent the unnecessary extension of the matrix to the base of the cavity, at the same time minimizing the quantity of gold to be used for the contouring. It therefore follows that the greater the cement area is, the greater will be the anchorage of the inlay.

Platinum and gold are the two metals used for making the matrices. The for-

mer is used more frequently because of its high fusing-point, while the latter, owing to its great malleability, ductility, and comparatively high fusing-point, is also available for the making, especially of gold inlays. The matrix gold, 22-k. fine, should be approximately of 40 gage, but to be more accurate the micrometer may be used, in order to obtain the absolutely accurate gage required. For deep cavities involving large surfaces thicker gold should be used, namely, 0.003 gage, and for shallow ones 0.002 gage. Pass the metal through the rolling mill, always in the same direction, as better results can be had by doing so, this procedure preventing wrinkling and producing a more uniform surface. Cut the gold in convenient sizes, say two inches long by one-half inch in width. Thoroughly anneal the gold before use.

It may be stated here that pure gold possesses a remarkable property that causes cement to adhere to it in a most tenacious manner.

In order to obtain an exact impression of the cavity so prepared, take a small

FIG. 3.

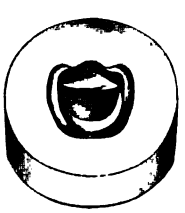


FIG. 4.

piece of impression compound and force it into position, trim it to the edges of the cavity, and after it cools sufficiently, remove it gently. From this run a cast and from the latter obtain a die. (Fig. 3.) Apply upon the die thus obtained a piece of gold of sufficient size, and adjust it to position by means of a piece of rubber.

The compound may be conveyed to the cavity on special cavity trays, of which I have constructed a set to meet the requirements in taking a good impression of any cavity. (Fig. 4.) These trays are sufficiently thin to pass between the teeth, and also quite rigid, so that by placing a small piece of gold on the impression contained in the tray, sufficient force can be applied by means of a small piece of rubber to press the gold with the fingers, in order to approximately accomplish the required result.

Trim the matrix approximately before re-swaging it in the cavity. This is accomplished by means of variously shaped rubbers, consisting of rings, cones, blocks, and with a special set of gold-matrix instruments of convenient forms which I have designed, and which facilitate an easier and more accurate application of the matrix to the cavity. In using these instruments, care should be taken not to burnish the gold at first, but to apply the instruments only with pressure, as burnishing will cause the gold to become rigid and more difficult to adapt and retain in the cavity.

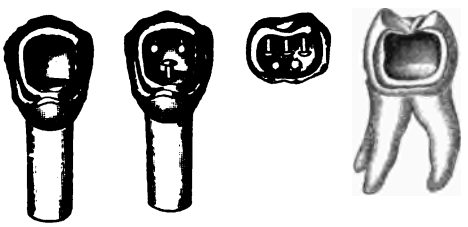
Frequently the matrix can be pressed and burnished in the cavity as described. without the necessity of previously obtaining a die. The matrix should extend a few lines in width over the whole edges of the cavity.

It is advisable in large compound cavities in molars, involving the buccal and morsal surfaces, to make the matrix in two pieces. This will prevent the buckling of the gold and facilitate a correct adaptation to the cavity. When one has satisfied himself that the matrix has been correctly adapted, it is removed gently by

teasing it out of the cavity with a fine-pointed instrument.

The next procedure is to take a stick of the compound and after softening one end press it gently into the external surface of the matrix. (Fig. 5.) Heat the

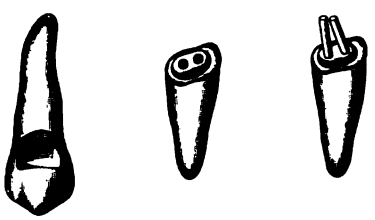
FIG. 5. FIG. 6. FIG. 7. FIG. 8.



compound over a Bunsen flame. Care must be observed in doing this, as any undue pressure may change the form of the matrix. The latter being imbedded in the compound, drill holes for the insertion of the pins. The pins should have well-formed heads (Fig. 6), and their length must be determined by the depth of the cavity. Fig. 7 shows a completed inlay for a mesio-occlusal cavity in a molar (Fig. 8).

In teeth with living pulps where the cavities are of limited depth (Fig. 9),

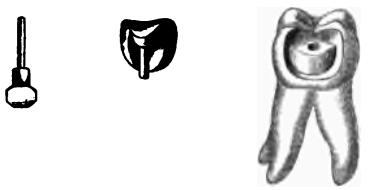
FIG. 9. FIG. 10. FIG. 11.



insufficient for any extended anchorage, countersunk holes should be made. (Fig. 10.) The countersunk holes are prepared by inserting graphite points into the plain holes. (Fig. 11.) They should be made to penetrate beyond the matrix, and after the filling-in process has been accomplished they are removed, thus leaving holes which, becoming filled with the retentive material, will afford sufficient anchorage for the inlay.

At this stage, if the operator should find it necessary, he could further increase the retention of the inlay by using both pins and countersunk depressions, or by using a small tube sufficiently long to obtain a strong anchorage at the base of the cavity, extending it as high as the surface of the core. To secure this in position, it would be well to solder at the lower end a small plate of metal, as will best suit the extent of the cavity. This tube attachment (Fig. 12) is cemented permanently in an upright position, so that the wire anchorage, which is

FIG. 12. FIG. 13. FIG. 14.



attached to the matrix, will accurately pass within the already cemented post in the core.

The hollow post which is fastened in the tooth should extend slightly beyond the core, so that when the matrix is compressed over it, it will produce a slight indentation which will indicate where to penetrate the matrix for the anchorage post, which should fit the hollow tube accurately.

To make the contour, cut a piece of 22-k. gold and apply it to the vacant side of the inlay; wax it in position. Finally insert the matrix and all its attachments in plaster (no sand being used) to hold them in place while the filling-in process is accomplished. 20-k. solder

should be used for soldering the work throughout, as by this means, when completed, it will have a decidedly rich appearance. (Figs. 13 and 14.)

In using borax as a flux, do not apply very much at a time. It should be sprinkled on dry, for if it be used wet it may possibly form an incrustation which might prevent the solder from flowing to all the parts of the matrix and its attachments. To cement the inlay in position, select the very best and finest cement obtainable. After giving the cement sufficient time to set, the inlay should be trimmed, polished, and burnished.

In constructing the inlay for the anterior teeth, the method which I follow is very similar to those which have been described; namely, the application of the core to the cavity, the taking of the impression, the construction of the die, and the various attachments necessary, such as pins, posts, loops, and countersunk depressions, when the inlay is cemented and finished in a similar manner. Of course it is well to avoid the use of the gold inlay in these teeth, as the porcelain inlay meets all the requirements, but when it cannot be substituted, the gold inlay can be successfully used.

It may be stated here that it is not intended that the gold inlay should replace the gold filling, but rather that it should supplement it.

Orthodontia.

Dr. G. C. Ainsworth, Boston, Mass. The clinician demontrated a simple automatic appliance for spreading the dental arch, a preliminary requirement in the large majority of cases of irregularity; also an inclined plane-attachment to the upper incisors for jumping the bite and adjusting the occlusion and a simple hygienic retaining appliance.

Dr. F. Messerschmitt, Rochester, N. Y. "Construction of Jackson's Regulating Appliances."

This clinic consisted of a demontration of the carving of models, the making of partial clasps, the bending of wires and the soldering of appliances, as described by Dr. Jackson in his system of correcting irregularities of teeth.

Dr. Messerschmitt used German silver and platinum-nickel wire and made the partial clasps of gold-faced platinum; the gold surface to come in contact with the teeth. The appliances were soldered with chemically pure tin (Merck & Co.) by means of the soldering iron, using a weak solution of zinc chlorid as a flux. The advantage of pure tin over soft solder is that it is cleaner in the mouth, does not disintegrate, and appliances soldered in this manner can be worn for a greater length of time without any danger of the wires becoming loose. The clinician also exhibited a number of nicely colored models with appliances in position.

Dr. O. H. Manhard, St. Louis, Mo. "A Simple Removable Appliance to be Used in Cases of Retention." The appliance shown by the clinician was one

adapted to a case of pyorrhea of the lower incisors. The right and left centrals were very loose, the lateral slightly so, and there was in addition considerable loss of tissue. The appliance was made with the assistance of the Bryant bridge-repair outfit in the following manner:

First, a plaster impression was taken, from which a good plaster model was secured. A strip of pure gold about 32 gage was then adapted to the lingual surfaces of the teeth, extending from the right to the left canine. This was accomplished by burnishing the metal right over the model. Over this was flowed a sufficient quantity of 20-k. solder to give the proper strength to the appliance. This produced a lingual and labial splint of perfect adaptation. Iridio-platinum wires of tooth-pin gage were then soldered to the lingual splint, allowing them to pass through between the lateral and canine teeth. On the ends of these, threads were cut with the tape of the Bryant outfit, and countersunk openings were made on the labial splint with the bur of the Bryant outfit—furnished for that purpose—to receive the wires of the lingual splint. The splint is secured into position by simply passing the wires of the lingual splint through the openings in the labial splint, and screwing them together with a Bryant nut on either end.

Dr. A. L. Midgley, Providence, R. I. "Fractures of the Jaw with Models and Appliances."

The treatment of fractures of the maxilla and mandible was demonstrated by means of models and appliances. Models of cases in practice showed the alignment of the teeth both before and after treatment.

Case I. Double fracture of the left maxilla in the bicuspid and molar region. On account of the marked displacement, and since the antrum was involved, the case was treated with a vulcanite interdental splint and skull cap.

Case II. Simple fracture of the mandible in the incisal region with little displacement. The aluminum splint used in treating this fracture was shown.

Case III. Simple fracture at the angle in an edentulous mouth. The upper and lower dentures of the patient were vulcanized together and used as any interdental vulcanite splint in conjunction with the skull cap. In this way the relation of the two jaws was not altered.

Crown and Bridge Work.

Dr. D. O. M. Le Cron, St. Louis, Mo. "Modern Crowns and Continuous Gum Work."

Dr. L. L. Bosworth, Cleveland, Ohio. "The Use of the Electric Current in Gold Soldering."

Dr. G. A. Bowers, Nashua, N. H. "Original Method of Tipping Porcelain Teeth for Bridge Work."

The facing is beveled from the cutting edge toward the pins (Fig. 1) and backed with pure gold, 35 gage, allowing the gold to extend well out from under the facing. (Fig. 2.) The backing, after

being thoroughly fitted either by hand or swaging, is removed from the facing. The reinforcement may be made by melting pure gold scraps, with a little platinum or clasp metal added for hardness. Cut a piece of metal of sufficient length to extend across the cutting end of the facing, the thickness of this supplementary piece being governed by the nature of the bite; with a pair of tweezers hold this extra piece in apposition with the cutting edge of the backing, and unite the two with a little solder. (Fig. 3.) Place the backing upon the facing and finish. Fig. 4 illustrates a reinforced backing for close-bite.

The posterior teeth are prepared in the same manner, being tipped and finished and incorporated into the bridge, the bite being restored by swaging the lingual or palatal half of the cusp in gold upon a die plate and waxing it to the finished tip. (Figs. 5 and 6.)

Corner restorations may be made by grinding away the facing and bringing the gold over it and the part to be restored. It is then removed and the supplementary piece added. (Fig. 7.)

This system has a wide range of applicability and the operation always results in a perfect-fitting tip.

Dr. W. A. Brownlee, Mount Forest, Ontario. "Crowning a Root Decayed Below the Gum Margin."

It was my purpose to show my method of crowning a root so decayed below the gum margin as to render impossible its restoration with a porcelain crown. When the root has been treated and tested for a length of time sufficient to assure the operator that it would be safe to complete the work, the apical foramen is sealed with very short gutta-percha points. Now, with a drill, the sides of which are parallel, straighten and enlarge the canal to about the size of No. 7 in Martin's screw plate, and with a small steel tap of that size cut a thread in the prepared canal.

For posts I prefer platinum, as it is tough and easily manipulated. Select a piece the required size and pass it through the screw plate, cutting a thread over its entire length. Dip the end in chloro-percha and screw it tightly into the canal already prepared, cutting it off an eighth of an inch below the margin of the gum. Proceed with each canal in the same manner. After the posts are all in place, fill the canals around their base with cement. Make a German-silver band the size of the root, place it in position over the posts, and retain it there by packing around it cotton saturated with Mills' cavity varnish. With a slow-setting amalgam pack the root around the screw-posts, filling the band also. Be careful to leave sufficient space between the amalgam and the occlusal surfaces of the opposing teeth to allow for

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7.

Fig. 1: Facing beveled ready for backing. Fig. 2: Facing with backing showing overlap. Fig. 3: Backing and tip ready for soldering. Fig. 4: Reinforced facing for close-bite without display of gold. Fig. 5: Soldered. Fig. 6: Finished bicuspid with reinforced backing. Fig. 7: Restoration of corner.

the reinforced cusps on the shell crown. Dismiss the patient, and at a future sitting cut off the German-silver band and fit on a gold shell to suit the case.

The advantage I claim for this method is that the anchorage is not dependent on the weak part of the root, but is deep down in the canal, so that fracture of the root is next to impossible.

If the operator should desire to use a porcelain facing, allowance can be made for it while preparing the German-silver band and during the subsequent building up of the stub.

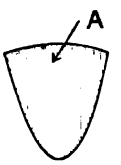
Dr. W. A. WHITE, Phelps, N. Y. "A New Method of Adjusting a Porcelain Crown, as Suggested by Dr. I. C. Curtis, Fulton, N. Y."

In the usual method of setting porcelain crowns, the greatest difficulty with which we have to contend is the washing away of the cement by the saliva, necessitating the continual renewing of the former. With the method devised by Dr. Curtis this washing away of the cement seldom, if ever, occurs. The method of procedure is to prepare the root and crown in the ordinary manner. The end of the root is painted with chloro-percha, and a thin suitably-sized disk of Hill's stopping or rubber such as is used for temporary fillings is placed over the face of the root. The crown and pin are then heated and the pin is forced through the disk into the root-canal, and after allowing it to cool is removed. In removing the crown the disk will also come away, and the surplus of the rubber disk is then trimmed off. Again paint the end of the root with chloro-percha, and fill the root-canal with cement. A small amount of cement is then applied to the pin, the pin and the gutta-percha are slightly heated, and the crown adjusted to the proper position. Before removing the pressure allow sufficient time to elapse for the chloro-percha to set, and it will result in a perfect union between the end of the root and the disk, with no cement exposed to the action of the secretions of the surrounding tissues.

Dr. R. M. SANGER, East Orange, N. J. "The Sanger Half-Collar Crown."

A piece of pure gold plate, gage No. 30, is cut to about the shape of Fig. 1. Being

FIG. 1.



annealed it is grasped at the straightest edge (Fig. 1, A) with a pair of clasp-benders, and hammered down to the flat end of the benders with a small riveting hammer (Fig. 2), until it assumes the shape shown in Figs. 3 and 4. With a pair of curved shears it is cut along the collar on the outside at A, A, Fig. 3, and trimmed down so that the metal tongue will pass between the two free edges of the collar, as in Fig. 5. It is then placed on the root in the mouth and burnished and trimmed to fit, the root having been previously shaped as in Fig. 10. It is then carefully removed and soldered along the free edges on the outside and the points cut off, giving you a half-collar cap, as shown in Fig. 6, which perfectly fits the root. The balance of the work is the same as in the construction of any backed and soldered crown.

If, however, you desire to construct an

all-porcelain crown, No. 32-gage platinum is used instead of pure gold, and the two ends (Fig. 5, A) are not cut off, but are burnished down on to the tongue, when the cap is burnished to shape in the mouth to give additional stiffness, and

FIG. 2.

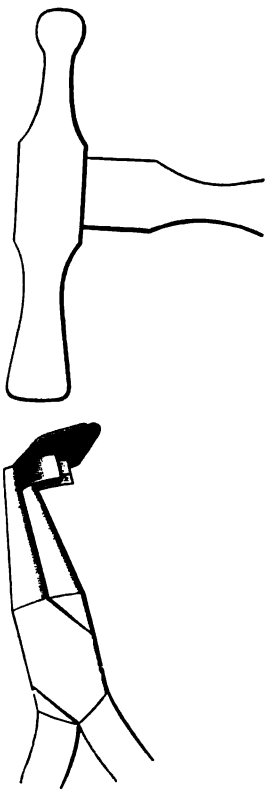


FIG. 3.

FIG. 4.

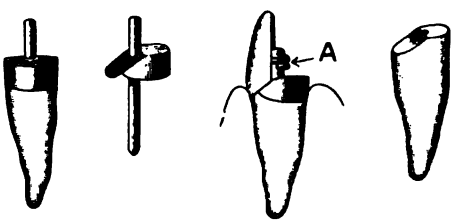
FIG. 5.

FIG 6.

then soldered with pure gold or platinum solder where they lap. The cap is again placed on the root and a platino-iridium pin is pushed through the cap, but instead of cutting it flush it is allowed to extend above the cap, as in Figs. 7 and 8. A little sticky-wax is placed on the pin and cap, and they are carefully withdrawn and soldered together on the outside. A cross-pin plate tooth is selected and ground to fit in the mouth with the cap and pin in position, the pins are bent around the post as in Fig. 9, and, with the aid of a little sticky-wax it is all withdrawn, invested, and soldered at A, Fig. 9. This holds the facing firmly in position while the porcelain is built up and baked to the proper contour on the lingual surface.

A Logan or Davis crown can be used with the platinum half-collar by grinding the crown well off at the palatal and approximal edges, and with the cap in position in the mouth a little moist porcelain body is placed around the pin and under the edge of the crown, and the

FIG. 7. FIG. 8. FIG. 9. FIG. 10.



crown is pushed to place. With a burnisher the cap and crown are teased off together, placed in the furnace and fused. A second baking will be necessary to restore the palatal contour and fill in the shrinkage. The work must be heated and cooled slowly to avoid checking the crown. I have said that this is a universal instrument, and so it is, as the size of the collar depends on the size of the hinge. By cutting a little farther around, these wings can be compressed to fit the smallest root, while by cutting a little away from the band the wings can be extended to fit the largest root. Dr. Smith of Cincinnati has also suggested the use of this instrument to form the full collar by taking a dentimeter measure of the root, cutting your gold disk Fig. 1 wide enough at the edge A to encircle the root with the wings.

W. J. MUMMERY, Ann Arbor, Mich. "The Inlay Post and the Inlay Crown for the Ten Anterior Teeth."

While our chief aim should be to preserve the natural teeth in their normal condition, or as nearly so as possible, we are often called upon by our patients at a time when caries has progressed to such an extent as to require large inlays or fillings and frequently not until the entire crown of the tooth has become disintegrated or the root badly decayed or broken away. We have been inclined to think that as long as the remaining root was in a good condition it would be possible to insert upon it an artificial crown, thus restoring the tooth to its former usefulness; but if the root is decayed or broken down to a considerable extent below the gum line, it has been deemed almost impossible to place upon it a crown that would restore to it its former beauty and usefulness, as such a root would be too frail to support a crown. It is to such a class of roots that I desire to call your attention, and in particular to those that it is next to impossible to band. I believe that many of the roots now banded would do better service without the band, if such ready-made porcelain crowns as the Davis, Justi, or Brewster were properly adapted to the root.

For such roots as this I have found it possible and practical to produce a post or crown which so closely adapts itself to the root that it actually supports it.

The first thing to be considered in crowning the root is the perfect adaptation of the crown to the root. This is often very difficult to obtain. When a case presents itself that is quite difficult, one that is just a little beyond our ability, we are too prone to consider it not worth while, or that the remuneration we receive from our patients is not sufficient to compensate us for the effort necessary to be put forth in order to produce a satisfactory result.

We will first consider the most common causes of failure in crown work.

(1) The lack of proper adaptation of the post of the crown to the root-canal, thus making it necessary to use a large bulk of cement. Any joint requiring a large amount of cement cannot be strong, as the cement soon becomes foul and its adhesive qualities lessened.

(2) Breakage of the post, usually occurring at a point in the root-canal not distant from the opening.

(3) Imperfect adaptation of the base of the crown to the face of the root. A root decayed below the gum margin at one or more aspects renders it impossible to grind the crown to a close adaptation with the face of the root. Large spaces in such cases are left to be filled with cement, which sooner or later deteriorates, or being washed out, produces a lodging place in which filth accumulates.

(4) The failure to grind the base of the crown to the same size and shape in circumference as that of the root, thus leaving an overhanging border at one aspect or an exposed surface of the root at some other point, forming a pocket for the accumulation of food débris, and leaving a sharp, overhanging margin to irritate the gum tissue or an exposed surface of the root to decay.

(5) The failure to place the crown in exactly the proper position on the root in the final setting, causing an overhanging margin upon one aspect and exposing the root at the opposite, even though the crown had been ground to exactly the size and shape of the root.

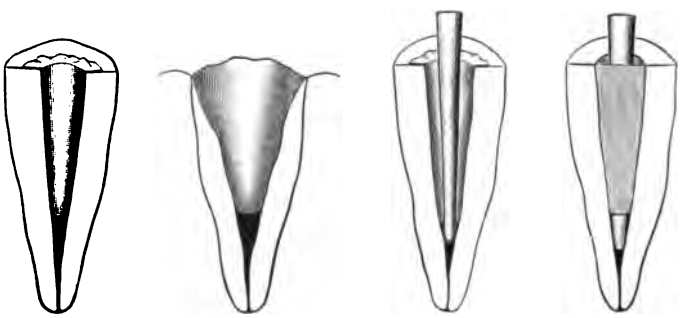
Having reviewed some of the principal

causes of failure, we will now describe the manner of remedying them.

(1) The perfect adaptation of the post of the crown to the root-canal. As we cannot always control the size, shape, or position of the canal, we must in some way produce a post that will accurately fit the root-canal in each individual case. This is a very simple task, however large or deep the hole in the root may be. After properly preparing the root-canal with as smooth and even walls as possible, form a cone of suitable size and shape of platinum foil 1-1000. Place this in the root-canal and burnish it to fit the walls and aperture of the canal, to assure a perfect adaptation of the matrix to the margin of the aperture and to secure a flange that will stiffen the matrix, as shown in Fig. 1.

If the root is so badly decayed as to leave but a sharp edge, as shown in Fig. 2, burnish the platinum foil over the margin of the root under the gingival margin of the gum where possible. Pack the matrix full of fine asbestos fiber, remove it from the root, and solder it. Enlarge the canal toward the apex to a size suitable to receive the ordinary post as furnished with the crown to be used. Grind the crown to fit the face of the root. Cut off the post—if necessary—to proper length, place the matrix in the root-canal and with the post in place in the crown place a little adhesive wax on the post. Warm it and force the post and crown to place on the root through the apex of the matrix toward apex of the root, as shown in Fig. 3. Remove the crown, post, and matrix together. Invest it so as to hold the post and matrix together. Remove the crown and wash out the wax. Fill the matrix around the post with gold solder. We now have a post that will accurately fit the root-canal, as shown in Fig. 4. Set as in any ordinary case.

Fig. 1. Fig. 2. Fig. 3. Fig. 4.



What are some of the advantages of such a post? (1) Perfect adaptation to the walls of the root-canal, thus requiring but the least film of cement and making a good support for the walls of the root. (2) A post that cannot be broken within the root-canal, the place where the average post usually breaks. (3) It produces a perfect guide for the final accurate setting of the crown, thus avoiding an overhanging margin or exposed surface of root.

It often occurs that the root is decayed or broken some little distance beneath the gum line, making it impossible to grind a ready-made crown to perfectly fit this portion of the root. In such a

case we burnish a matrix to close adaptation to all of the uneven surface and as far up in the root as the hole makes it possible, burnishing the foil over the edges under the free margin of the gums wherever possible. The matrix is removed and soldered as before, if this

FIG. 5.

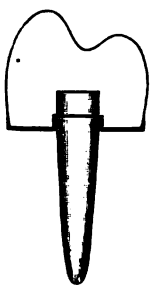
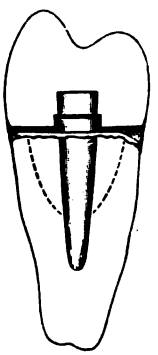


FIG. 6.



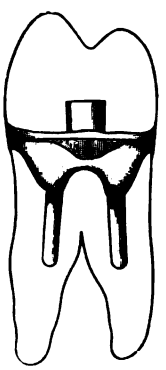
should be considered necessary. If the root-canal is of no considerable depth a cone is not necessary, but instead a plain piece of foil is burnished to the face of the root. In such a case it is not necessary to solder the cone at this time. The crown is next ground to fit the root as accurately as possible. A piece of platinum or gold foil is burnished over the base of the crown, shown in Fig. 5. The post is carried to place in the crown, forcing it through the matrix on the crown. With the crown, matrix, and post together, a little adhesive wax on the post and matrix, and the matrix in place on the root, force the crown to place on the root, forcing the post through the matrix on the root. The wax unites the two matrices and the post. Remove the post, crown, and matrices together. Remove the crown from the post. Invest the matrices and post in their proper relation, exposing the margin of the matrices from one-third to one-half of their circumferences, in order to make it possible to melt out the wax and to flow the gold solder to fill the space between the two matrices, thus uniting them to the post. We now have a post and cap combined that will accurately fit the root-canal, the uneven face of the root, and the base of the crown as shown in Fig. 6; set as any ordinary crown.

To produce a combined cap and post of this kind for a root having two fine canals as is often the case with the bicuspids, instead of drilling the root to receive a single post as is so often done, greatly weakening the root and taking grave chances of drilling through the side of the root, I enlarge the canals slightly and fit a staple post of iridio-platinum wire shown in Fig. 7.

Fit the matrix to the root as previously described. Force the staple post to place through the matrix into the root and unite them with wax. Remove and solder.

FIG. 7.

FIG. 8.



Grind the base of the crown to fit the root as closely as possible and burnish a matrix to fit base of the crown. Force the regular crown post through the matrix to place in the crown, cut off the post just below the matrix, unite them with wax, remove and solder. With staple post and matrix in place on the root, and

with matrix and post on the crown, place the crown in its proper position on the root, supporting it with a little adhesive wax. Remove the crown, post, and matrices together, and the crown from the post and matrices. Invest and solder as in the previous case. We now have an inlay staple post and cap combined, that will properly fit the root-canals, the face of the root, and also the base of the crown as shown in Fig. 8. Set as any ordinary crown.

If the operator should desire to use a facing in place of the crown for the six anterior teeth, the matrix is formed as in previous cases, using an iridio-platinum post, grinding the facing so that it will fit the root, backing it with gold, and placing it in position on the root. Unite the matrix, the post, and the facing with a little adhesive wax, then remove and invest them, fill in the matrix and back of facing with gold solder.

If porcelain is to be used exclusively, the matrix is formed as before, using an iridio-platinum post. Grind the facing so that it will properly fit the root. Unite it to the post by means of pins, fill in the matrix and build up the back of the facing with porcelain body, using as many bakings as may be deemed best by the operator. Peel off the matrix, and a crown composed entirely of porcelain with an iridio-platinum post will have thus been obtained. The porcelain taking the place of the gold inlay posts forms the porcelain inlay crown.

We frequently find that a root carrying an imperfectly fitting crown will split far beneath the gum line, thus rendering compulsory the removal of the crown and quite a portion of the root. Such roots are not beyond repair. The loose piece of root is removed, the remainder is properly cut to make it possible to form a matrix to fit the root as shown in Fig. 9, and when possible a half-band and cap are fitted. The matrix, half-band and cap are united with solder. An iridio-platinum post is now forced to place through the matrix, as far toward the

Fig. 9.

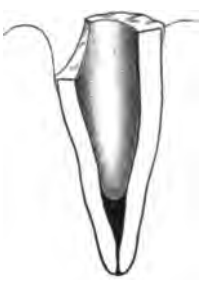
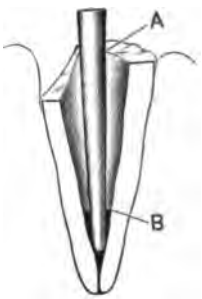
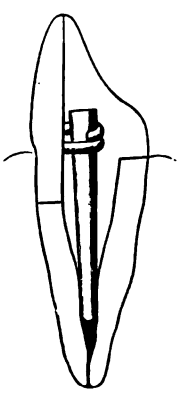


Fig. 10.



apex of the root as may be considered safe. The post is united to the apex of the matrix and cap as shown in Fig. 10, at A and B. A porcelain facing is now ground to fit, extending the neck of the facing as far under the gum line as ad-

Fig. 11.



visable under the circumstances. The facing is attached to the posts by the aid of the pin.

The matrix is now filled with porcelain body, also the back of the facing and both are baked. The entire tooth may

be built up with porcelain body if desired instead of using the facing. I have been enabled by means of this method of crowning to save many teeth that I could not save in the past, and have also found it especially useful in cases where the teeth stand far apart. In such cases it is often impossible to insert an artistic piece of bridge work. It is also peculiarly adapted to canine roots because of the depression of the lip which is sure to follow the extraction of these teeth.

Gold Operations.

Dr. F. W. Stiff, Richmond, Va. "Ivory's Plastic Crystal Alloy."

Dr. Stiff's clinic consisted of filling a large compound cavity in the upper second molar, demonstrating the use of Ivory's "crystallia" as a base for gold fillings. The pulp was nearly exposed, yet without the use of any other non-conducting material, two-thirds of the cavity was filled with the above mentioned material, which seems to be composed largely of tin, if not altogether of that material. It was packed into the cavity with Royce pluggers, and the filling was finished with Watts' gold, manipulated with the same pluggers.

Dr. L. C. Taylor, Hartford, Conn. "The Effects of Heat in Combining Cement and Gold for Hygienic Fillings."

After placing a small amount of cement into the cavity we proceed to pack the gold directly into the cement while yet soft. The porous forms of such gold as moss fiber, DeTrey's, or Watts' crystal, should be preferred in this connection, as the heat of the burnisher will draw the cement into the little openings in the gold, thereby making a strong retainer. We are told by professional goldbeaters that it takes from sixty to ninety seconds to restore the cohesive qualities, with the gold at red heat. We also find that by bluing the steel instrument it is possible to burnish well-annealed gold foil, piece on piece, without the mallet, a procedure more agreeable to the patient and one which does not result in pitted surfaces.

Dr. C. H. Gerrish, Exeter, N. H. "The Use of Non-cohesive Gold Foil."

Dr. Gerrish demonstrated a method of filling teeth with non-cohesive gold foil, also a method of making combination fillings, finished with Pack cylinders of semi-cohesive gold. Dr. Gerrish also demonstrated in the mouth the use of the napkin in combination with the rubber dam, for the purpose of securing a dry field for work.

The clinician demonstrated the following method of crowning fractured and badly decayed roots. After removing all decay, trim the root. Take a platinum pin, reinforce it by soldering its sides with pure gold, and secure its correct adaptation to the root-canal by hammering on an anvil. Cut a disk of platinum foil a little larger than the face of the root, force and fit it to the surface of the root, and push the pin through it. The disk and pin are waxed together, with-

drawn, invested, and soldered, allowing the solder to flow out nearly to the edge. The disk is then trimmed to fit the face of the root, and the remaining stub is cut off. A suitable tooth is now selected. The S. S. White hand-stained teeth are the best, for they are bold and natural in appearance. Grind off the head of the pin, back the tooth with pure gold, fitting it to the platinum cap. The tooth and disk are now waxed together *in situ,* removed and soldered, and as the final result, a crown will have been produced that does not change color and looks like a natural tooth, a pin that fits without any motion, a base of platinum that absolutely fits the irregular root, requiring a minimum of investing material, and the best fitting and most natural crown it has been my delight to construct. The crown is set with gutta-percha. I use for this purpose the Evans gutta-percha outfit.

Dr. J. V. CONZETT, Dubuque, Iowa. "Gold Filling Cavity in the Approximal Surface of an Upper Molar or Bicuspid."

Dr. Conzett's clinic consisted in the insertion of a gold filling in the mesio-occlusal surface of an upper left first molar. There was no separation and a previous flat amalgam filling had completely destroyed the interproximal space. The cavity was made according to the Black-Wedelstaedt methods, with flat seats, parallel walls, and no undercuts. The lines of the cavity were extended well into the regions of comparative immunity, and the cavo-surface angle was properly beveled. In making the filling two cylinders of one-quarter sheets of unannealed foil were placed in each angle, a one-half sheet cylinder was placed upon the gingival seat between them, and the whole was thoroughly malleted to place. The unannealed foil was started in the disto-buccal angle and was built up and forward, effectually locking the soft foil to place. A mallet force of about ten pounds to the blow was used throughout, augmented by a hand pressure of about fifteen pounds.

In finishing the filling, the surplus foil in the interproximal space was sawed out with a Black saw, the filling trimmed to shape with Wedelstaedt interproximal trimmers and Black knives, and the filling was polished with sand-paper disks and strips, pumice, and tooth-powder. The interproximal space was perfectly restored, and a good contact obtained with the approximating tooth.

The clinician also inserted a gold-filling in the disto-occlusal surface of an upper left canine. The cavity was prepared according to the Wedelstaedt incisal-anchorage method, in which the disto-mesial third is partially ground down and the gold is built over it. This preparation is used because of the impossibility of gaining access to a cavity in the distal surface of a canine in any other way. The procedure, apart from the difference in cavity preparation, was the same as in the first operation, except that no unannealed gold was used.

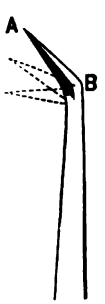
Dr. W. B. DUNNING of New York city gave a table clinic, demonstrating the manipulation of strictly non-cohesive gold foil upon the wedging principle; emphasizing the value of that method in the rapid and accurate filling of small simple cavities.

The care necessary to perfectly adapt cohesive gold to the walls of pit, fissure, and other cavities of the class mentioned

is well known, and is constantly indicated by the high percentage of failures in such operations, where a "tight joint" would insure permanence for a lifetime. The demonstration was confined to such cavities, because of the facility with which the operation may be perfectly performed. It is not recommended for those of larger size, in which cohesive gold may be used without misgiving. In fact, the exclusive use of non-cohesive gold in large cavities is contra-indicated, because of the great lateral strain caused by the wedging process. The labor necessary to properly condense and finish such fillings increases in direct ratio to the size.

The gold used was Abbey's soft No. 4, which retains its non-cohesive property until welded by sheer pressure. The essential instruments were a sharp, smooth-sided, wedge-shaped plugger (Fig. 1)

FIG. 1.



Length A to B=13 mm.

and a small long-handled finishing bur —the latter used for rolling down or vertically condensing the gold after it had been laterally condensed. These were used under hand pressure—held pencil-wise. The angles of the four-sided wedge were kept sharp and bright by frequent applications to an Arkansas stone, followed by a buff strip.

The cavity was prepared in the usual way, without retaining-pits, and with as little undercut as possible, the walls being nearly perpendicular to the floor.

The gold was rolled by hand into firm pellets, roughly spheroidal or cylindrical in shape according to the convenience of the case. Care was taken to have all free edges tucked in. A pellet was picked up by pressing the plugger point obliquely into it—not tearing or "stabbing" it—and this was carried by a firm side-sweep against that part of the cavity wall (usually at some angle) best calculated to hold the first piece. This was thoroughly condensed laterally with the side of the plugger; that is, from the floor toward the orifice of the cavity, keeping the wall of gold vertical. A considerable surplus was allowed to protrude above the margin. The next pellet was packed in a similar way, either against the first or into some other convenient angle, and this process was continued with other pellets until all the walls were covered with condensed gold, and an opening remained toward the center of the mass, care having been taken to leave an ample surplus. Smaller pellets were wedged into this opening or pit, carried as deeply as possible, and were vigorously packed away from the center until no more gold could be crowded before the plugger point. The entire surplus mass was now brought together by an oblique "tucking" motion of the plugger, care being taken not to tear the gold. The finishing bur was now rolled against the gold in all directions, obliterating the plugger marks and condensing the gold vertically. The inequalities were now roughed off with a file or engine instrument, and the resulting surface was most thoroughly gone over with the plugger, the point being

deliberately "stabbed" into the gold, and every effort made to find any soft or insufficiently condensed portion. Such a spot, being found, was converted into a new cavity by plunging the instrument as far as possible into the gold, and filling as before with a new pellet. This surface was again vertically condensed by vigorously rolling the bur from the center of the filling toward the margins, actually sending a little wave of the metal against the surrounding walls, crushing out the plugger marks, and further solidifying the metal already welded by the wedging process. In small fillings, the surface thus obtained may now be carried to a perfect finish by the ordinary means; but bearing in mind the fact that the welding of this gold must necessarily be superficial, any considerable grinding must be followed by further condensing, the whole being worked down until that hard, brilliant luster typical of dense gold is obtained. The finished filling will in every way serve its purpose, as is proved by the longest clinical history of all filling materials, notwithstanding the fact that the body of the filling, removed from the cavity, may be readily pulled apart between the fingers as though made of so many paper wads. Provided the cavity walls are intact, it is obvious that the heaviest stress of mastication can do no more than improve the "fit" of such a filling. If, however, the gold has been properly condensed in the first place, it will "stand up" under the severest usage.

Miscellaneous.

Dr. William Conrad, St. Louis, Mo. "Oral and Dental Hygiene."

Patient, Dr.——. The teeth and gums were in bad condition, there being gingival recession and erosion cavities. The third molars had not been properly cared for. The clinician removed the tartar and stains, dressed and polished the sharp edges of the teeth, and used a ten per cent. solution of silver nitrate on the teeth and gums. The teeth were of unequal length, and were regulated by grinding the occlusal surfaces so as to produce a better appearance, and a more hygienic condition of the oral cavity. We dress and polish teeth to preserve them from injury and to save the lips, tongue, and cheeks from irritation caused by sharp and rough edges.

Three patients: First, Dr.——. Fair teeth, well cared for. Erosion appearing in quite a number of places, and of recent origin. The tartar and stains were removed, and the teeth and gums were treated with a ten per cent. solution of silver nitrate. Polishing was then resorted to in order to make the teeth and gums hard. All sharp edges were dressed and polished.

Second, Dr.——. Bad case of erosion. Every type illustrated. The teeth and gums had been badly cared for. All sharp edges were dressed down and polished. A ten per cent. solution of silver nitrate was used on the teeth and gums, and the teeth were thoroughly polished. The interproximal spaces were cleaned, all tartar deposits removed, and in some cases the interproximal spaces were packed with gutta-percha after having been treated with pure white carbolic acid. The gold filling in the upper left

central and lateral incisors should never have been put in, as the erosion had extended far beyond the margins of the fillings. These teeth can be saved even if much neglected, and in but few cases need filling.

Third, Dr.——. Case of pyorrhea alveolaris. Same hygienic treatment used as in the previous cases. A ten per cent. solution of silver nitrate was applied to the teeth and gums, which was followed by hard brushing and polishing. All deposits were thoroughly removed. Devitalize the pulps and fill the root-canals where so required. Pyorrhea alveolaris can be cured, but the teeth and mouth must be placed in a proper hygienic condition.

Conclusions as to the treatment of the above cases, and many others like them, and the results to be expected follow:

The first thing a dentist and a patient must learn is that "clean teeth cannot decay," and the nearer we reach this desired condition, the more wonderful will be the results.

Very few dentists are prepared for this work. They require the help of all available improvements for saving time and avoiding pain, also a lady assistant to carry out this time-consuming work of treating and polishing. There is no substitute for the ten per cent. solution of silver nitrate applied to the teeth and gums as often as the case may require. It is used on all patients where there is need for it, and its application is followed with hard polishing. This treatment will make the teeth whiter, brighter, and harder. Most cases are polished once a week while under treatment. The patient applies the silver nitrate once a day to the teeth and gums during this time at home. The silver nitrate stain is very superficial. It makes the teeth look bad in many cases, but the darker the teeth become, the greater the need for its use. Only decayed or softened enamel takes the stain, as hard or healthy enamel or cementum will not stain. Tincture of iodin will assist in removing the stain from the teeth. Should the silver nitrate come into contact accidentally with the hands or face, tincture of iodin followed with aqua ammoniæ will remove it. This treatment will make any tooth whiter, brighter, and harder. Teeth that do not glisten under reflected light are not in a good hygienic condition. When the silver nitrate does not show discoloration of the teeth it is a sign that the patient may temporarily abandon the treatment, but never for a longer time than six months. When the teeth are sensitive to temperature changes, air, or friction, zinc chlorid (Merck's) should be used, as it gives immediate relief. Zinc chlorid is never indicated except for the relief of pain or tenderness. I find "vapocaine" of great value when applied before beginning the treatment. Camphophénique with two per cent. cocain added is used with good results. Camphophénique, two per cent. cocain, and iodin is another good preparation. Chloroform is also good and safe, and when applied to the gums will relieve pain and allay the nervous condition existing in all cases. When it is appreciated that from ten to fifteen drops will produce complete insensitivity in some cases, one will understand why we obtain good results from chloroform.

Young children are more benefited by the ten per cent. solution of silver nitrate than by any other preparation, when applied to the deciduous teeth and to the newly erupted permanent teeth. It does the work and he stands by it because it has helped over many a difficult place.

The best tooth-powder is one composed of precipitated chalk and oil of wintergreen (strong) used three times a day on the teeth and gums. In addition a two per cent. solution of carbolic acid may be used, rubbed twice a day on the teeth and gums with a tooth-brush. Orange-wood toothpicks (oval) should be used one or more times a day. Care should be taken not to injure the gums, but the toothpick should be pushed carefully through every interproximal space.

The tooth-brush should be used three times a day on the teeth and gums. The kind of brush to be used should be carefully selected. He recommends one of moderate size, with many bristles (white) close together, having a good spring, and with no split bristles or wax lines on the back, and with a strong handle. The bristles should be cut square on the ends so that the surface of the brush will be flat. This will reach every part of the teeth and gums. Should a small brush be desirable, cut the bristles to the required length.

Dr. G. T. Baker, Boston, Mass. "Thymoform."

This is a new preparation for permanently filling and disinfecting root-canals, and also an ideal mummifier.

Thymoform is a compound prepared with thymol and metallic oxids, in combination with formaldehyd. It comes in the form of powder and liquid. When mixed (as ordinary cement for filling), the resulting product is a powerful germicidal paste easily introduced into the root-canal. It is white and therefore non-staining: Contains no oil but is hygroscopic, and by uniting with the moisture of the dentinal tubules it thoroughly disinfects the dentin. In this respect it is superior to the essential oils, for however efficient as disinfectants, they will not penetrate the tubules which are always filled with moisture since oil and water will not mix. It does not crystallize but very gradually becomes harder, but never to such an extent as to prevent easy removal. It is persistently disinfecting and germicidal in its action, owing to the slow diffusibility of the formaldehyd in combination with the thymol. The small and inaccessible root-canals are acted upon and rendered aseptic, and the periapical region is restored and preserved in a normal condition. This preparation can be used as a permanent root-filling in conjunction with any of the methods of treating root-canals. It can also be used with cocain or arsenic, and is equally adapted for deciduous or permanent teeth.

Dr. John I. Hart, New York, N. Y. "Demontrating the Use of Mills' Prophylactic Instrument."

Dr. Hart demonstrated the usefulness of the Mills' prophylactic instrument, which consists of a handpiece, which can be attached to any slip-joint and operated by the dental engine. It has a reciprocating back and forward movement, and to it can be attached instruments of the D. D. Smith prophylaxis type, file- or tape-carriers, medicated cotton for gum massage, or wood polishers. It is particularly useful for carrying wooden points with which the necks of the teeth may be polished with absolutely no injury to the gum tissues.

Dr. T. W. Onderdonk, New York, N. Y. "Contour Band Matrix."

Dr. Onderdonk gave a demonstration of his (1) contour band matrix, (2) dentimeter and (3) assistant in making half-crown attachments, or so-called Carmichael crowns. It being one instrument —(1) As a matrix, by having the band cut on a curve, it gives a hopper shape to the matrix, allowing any desired contour of filling. (2) As a dentimeter, it secures an exact pattern of the band part of the crown, the circumference, the gum line, and the height. (3) As an assistant for making crowns, it holds the gold against the tooth in the mouth, allowing perfect adaptation of the gold to the tooth and grooves.

Dr. Harold DeWitt Cross, Boston, Mass. "Normal Occlusion of Artificial Teeth."

The clinician showed two casts illustrating a normal occlusion of artificial teeth with large masticating surfaces, sharp cusps, overbite, and compensating curve, in comparison with teeth of the plain-line arrangement.

A phantom head was shown with the plain-line and curved bite-blocks, illustrating the necessity of a curved arrangement of the teeth in proportion to the angle of the condyle path. Two casts were exhibited showing the method of obtaining the accurate angle of the condyle path in individual cases, both for partial and full dentures. The face-bow articulator and its use was also illustrated by three casts.

Dr. H. Carlton Smith, Boston, Mass. "Appliances Used in Testing Amalgam, Cement, etc."

Dr. Smith's clinic was illustrative of the course in dental chemistry as given at the Dental School of Harvard University. It included apparatus for testing the strength, flow, and expansion or contraction of amalgams; the expansion of plaster, and the comparative thickening of dental floss by the action of moisture.

The analysis of saliva and of urine, made with special reference to diseases bearing directly upon pathological conditions of the oral cavity, was also demonstrated.

The use of the polarized light in the detection of such soluble salts as the sodium oxylates, lactates, lacto-phosphates, and urates was illustrated by numerous slides.

Dr. L. S. Chilcott, Bangor, Me. "Silver Foil."

This clinic consisted in demonstrating the use of silver foil in filling teeth. The silver foil is used in connection with a forty per cent. solution of formaldehyd for filling the root-canals of teeth, often opening the root, treating with the formaldehyd, and filling with the silver foil at the same sitting. This foil is also used as a lining for cavities in posterior teeth of soft and chalky structure when they are to be filled with gold. The clinician said that he had obtained excellent success with it in covering perforations in roots. The canals are first very thoroughly disinfected with the formaldehyd, and after dipping the silver foil into a ten per cent. solution of formaldehyd, it is placed over the opening. The silver will discolor in the mouth, but will not have that intense black shade seen upon tin fillings.

The principal value of this method of using silver, the clinician claimed, was in the filling of deciduous teeth which

are too sensitive to be thoroughly excavated and dehydrated. He makes an opening sufficiently large to gain access, and without any further preparation fills immediately with the silver foil. He has secured as good results with that method as with the so-called "thorough methods," the fillings lasting until the time for the teeth to be shed.

Dr. J. S. DANFORTH, Sheboygan, Wis. "The Use of the Rubber Dam in Setting Bandless Crowns on Anterior Teeth."

The method used by the clinician consisted in applying the rubber dam to the root to be crowned, with the aid of the Ivory labial clamp to hold the tissues well out of the way of the operator. The objects of this method are to force the gum tissue up so far that the joint between the root and the crown will be under the free margin of the gum when the clamp is removed, and when the gum has assumed its normal position; also to prevent lacerating the gum when preparing the root, and to expose to view all parts in the field of operation. The approximate bite should be noted before putting on the rubber dam, and on the six anterior teeth the entire operation can usually be completed before removing the dam. Only in cases of extremely close bite is it necessary to remove the rubber dam to grind the crown for the bite before cementing the crown to the root. In ninety per cent. of cases, the first step in the operation should consist in placing the rubber dam and clamp into position, and the last, in their removal.

The cement can be trimmed much better if it is accomplished before removing the dam.

Dr. J. H. BEEBEE, Rochester, N. Y. "Darby's Tin."

The clinician demonstrated the method of making Darby's tin by means of an ordinary speed lathe and a sharp hand-turning gouge chisel. A quantity of pure tin is cast into a cylindrical form. The cylinder is then placed in the chuck on the lathe and its margin trimmed true and clean of all foreign matter. Then with the gouge fine shavings are made, as fine as possible, almost silken in texture. These are spread on a piece of clean writing paper resting on a flat surface, and another sheet of paper is placed over the shavings. A round object like a lead pencil is then rolled over the upper sheet with considerable pressure, condensing the shavings into a mat. The tin thus prepared is then cut into squares of required size, and is used as a filling material. It works much the same as cohesive gold, and the instruments used are the same as those used for gold. Absolute cleanliness must be exercised during the operation, as the slightest particle of moisture or grease will destroy the cohesiveness of the tin. It is advisable to prepare the tin immediately before using it, as it ages rapidly, and cannot be used after two or three days have elapsed since its preparation, even though it be placed in air-tight receptacles.

Dr. W. H. LEAK, Watertown, N. Y. "Amobilis Root-Canal Cement."

Dr. Leak demonstrated the use of amobilis as a root-canal filling in a number of extracted teeth. This preparation was shown to set very hard in a short time in the root-canal, but on the application of water could be easily removed from the canal. The clinician also demon-

strated in a number of tests the advantages of amobilis over chloro-percha, zinc oxyphosphate, and one of the leading mummifying pastes. The clinician claimed that this material is more easily inserted into the root-canal than other materials; sets very quickly with practically no shrinkage, and is easily removed should the conditions demand it.

Dr. M. L. FAY, Buffalo, N. Y. "Dental Refrigerant."

Dr. Fay's clinic consisted in demonstrating an instrument designed by himself for the refrigeration of the tissues, for aborting incipient alveolar abscesses, etc. The objection to holding a piece of ice against the cheek is that it does not reach directly the locality where the cold is mostly needed. Dr. Fay showed that with his apparatus the cold could be applied directly to the affected parts.

Dr. A. L. HAAS, Des Moines Iowa. "An Original Method of Obtaining Perfect Adaptation to the Root in Crown Work."

This clinic consisted in a demonstration of the use of an instrument, the Ivory root-seat swager, and of a method for quickly and accurately adapting a metal fitting to the end of a root that has been prepared for a "post and plate" crown. The root is ground off even with the gum lingually and approximally, and slightly under the gum labially, and the enamel is scaled off all around. The canal is enlarged and deepened for the post. If a porcelain crown is to be made, a piece of No. 33-gage platinum is selected, and burnished or adapted to the root-end, the post hole located, and a hole punched through the platinum. The post is forced through the platinum and the two pieces soldered together. The fitting is now burnished and adapted to the end of the root as well as can be done with the hand burnishers, and is then thoroughly annealed. The proper size cup is now selected, and two or three layers of pink vulcanite rubber are placed in it, and trimmed to the edge. This instrument is now firmly pressed against the fitting, and while the pressure is being applied the handle is given a dead blow with a lead mallet. The suddenness of the blow will accurately drive the metal home in perfect adaptation to the root-end. If a gold-backed crown is to be made, use about No. 32-gage pure gold. The instrument is simply a final adapter to be used after the fitting has been made as well as can be done by hand burnishing.

Dr. H. E. KELSEY, Baltimore, Md. "Cases of Irregularity Involving in Their Correction the Use of Intermaxillary Reciprocal Force."

Dr. F. G. COREY, Council Grove, Kans. "The Corey Combination Mallet and Pliers for Handling Gold Foil or Any Kind of Filling Material which Requires a Mallet or Plugger."

Dr. Corey's clinic was for the purpose of showing the economy of time resulting from the combined use of mallet and pliers in such a way that the two instruments can be manipulated simultaneously with the same hand and without the ne-

cessity of laying one down and picking the other up. He showed that one cannot obtain the required stroke from the mallets generally in use at the time needed, without a waste of time in adjustment, or the extra expense of an assistant.

Dr. J. C. WATKINS, Winston-Salem, N. C. "Prosthetic Porcelain."

Dr. Watkins gave a table clinic demonstrating several different uses of the Jenkins prosthetic porcelain in crown and bridge work. A number of interesting specimens were exhibited, showing different practical ways of using prosthetic porcelain.

A very pretty dummy for bridge work is made by soldering teeth to a platinum bar, and filling in with prosthetic porcelain, leaving the ends of the bar free to be soldered to gold crown abutments in completing the bridge. A convenient crown was made by burnishing pure platinum on a prepared root, with or without a band. Force an iridio-platinum pin of the desired size through the platinum, and solder with pure gold, leaving a projection to be caught by the pins of the plate tooth. After the tooth is properly adjusted, fill in with prosthetic porcelain, and after three or four bakings a beautiful crown is obtained. A wing bridge was also constructed in the same way by having a platinum skeleton filled with prosthetic porcelain. A four-tooth bridge with platinum shell crown abutments was also shown. It was a beautiful piece of work in which the "dentist's art" was completely hidden, and the clinician expressed the hope that it would prove practical, and that the veneer would not crack off nor peel away from the crown.

Dr. B. S. HERT, Rochester, N. Y. "Filling a Disto-Occlusal Cavity in an Upper Right Second Bicuspid."

The cavity was prepared according to Dr. Black's method, except that a shallow groove was made in the upper third of the buccal and lingual walls. A flat matrix was then inserted, passing slightly above the gingival wall of the cavity, and extending to within about one millimeter of the occlusal surface of the adjoining molar. The matrix was held in place by means of a soft pin wedge, the gingival part being broad enough to hold the matrix against the tooth, and the occlusal being shaped to a knife-edge. In filling, the entire floor of the cavity was covered with a layer of tin, then soft foil was added until the cavity was about one-third full. The surface of this part of the filling was left flat like the underlying floor of the cavity. The balance of the filling, both the approximal portion and the occlusal step were then finished with cohesive foil. After removing the wedge and matrix, the filling was finished with burnishers, trimmers, strips, etc.

With a filling inserted in this way very little time is required to finish the cervical portion, and the contact point can be made as perfect as desired.

Dr. SINCLAIR TOUSEY, New York, N. Y. "Demonstration of Apparatus for X-Ray Examinations of Teeth, as Well as for the Treatment of Pyorrhea, Cancer, and Other Conditions of the Mouth."

Dr. Tousey demonstrated his new magnifying fluoroscope for X-ray examination of the jaw in cases of fracture and abscess. Shaped like a jeweler's magnifying glass and held to the eye in

the same way, but with the large end closed by a piece of fluoroscopic screen, it is applied directly to the injured side of the face while the X ray shines through from the opposite side. It makes the examination for fracture, abscesses, or impacted lower third molars easy as compared with the other methods in vogue. The mouth should be open and the head inclined forward, to allow the X ray to shine through the tissues of only the affected side of the jaw.

The operation of an improved localizing X-ray tube for cases of Rigg's disease was likewise demonstrated. The X ray can only leave the tube through a very small window of ordinary glass; the remainder of the tube being made of lead glass, is transparent to light but opaque to the X ray. This is an improvement over the model previously shown, and being more powerful, brings the anticathode of the tube within four and one-half inches of the surface to be treated, and thus reduces the time of exposure. In the treatment of pyorrhea every case has responded immediately, pain has been relieved at once, and discharge and unhealthy appearances of the gums have quickly disappeared, in some cases remaining well so long, as to encourage the hope that the X-ray and high-frequency currents may eventually be the means of securing a permanent cure. This treatment is only auxiliary to the scaling of the roots, the application of antiseptics, and the equally important constitutional treatment required in certain cases. An X-ray examination of the affected area, generally made at the first treatment, may reveal the source of the trouble in the shape of an unerupted supernumerary tooth. The X-ray picture shows the absorption of alveolar process, which, if extensive, is not likely to be regenerated, but may be rendered healthy and the teeth made firm.

A new feature was the use of the X ray for making a picture of the head, especially of all the facial bones, looking directly at the front of the face. The antrum is seen at each side, and in a good radiograph, any abnormality present, pus or tumor; likewise the nasal passage, septum, and turbinated bones. At a higher level are the ethmoidal cells. The orbits show excellently and a foreign body present can be easily located. Above the margin of the brow is the frontal sinus, in which a collection of pus would be plainly indicated. These are the most difficult radiographs to make. The negative shows much better detail than any print. Looking directly at the face with the fluoroscope, the X-ray tube being behind the patient's head, a clear enough image is seen to show an expert, antrum or sinus trouble. But for a careful study of the case, a radiograph can be made with less than a minute's exposure, and every detail shown.

The application of high-frequency currents: Vacuum tubes with metal socket and insulated handle are excited by a high-frequency apparatus, and applied directly to the gums in cases of pyorrhea or neuralgia. The high-frequency apparatus consists of an X-ray coil, two large Leyden jars, and an Oudin resonator. When excited the tubes are filled with waves of violet and ultra-violet light, and a current of seventy-five to one hundred milliamperes applied to the gums without discomfort. There is a nervous and vascular stimulation with the production of ozone upon the surface and in the substance of the tissues by an electrolytic action. Therapeutically its benefit upon local lesions is very

marked, even when they are due to a constitutional cause.

Dr. Ira J. Coe, Baldwinsville, N. Y. "A New Feature in the Retention of Gold Fillings."

Although the use of soft cement under gold has been severely condemned, the clinician endeavored to demonstrate that this method has many points of merit.

In the first place, the cement is allowed to set thoroughly before attempting to condense the gold. This, it seems to him, would satisfactorily overcome the objection that a blow sufficient to thoroughly condense the gold would certainly powder the soft cement. But this difficulty is overcome by using a quick-setting cement. So far as he has been able to discover, the best cement for this purpose is the Ames special inlay cement, which will set in about two minutes. No time is lost, for during the interval the margin can be carefully freed from cement.

The clinician demonstrated the method under consideration upon a large compound cavity in the mesial surface of an upper right first bicuspid. In the preparation of the cavity the mesio-buccal and the mesio-lingual angles were included, and to more securely anchor the filling as well as to preclude the possibility of future decay, the sulcus was cut out. The pulp had been previously devitalized, and the root contains a good filling.

In a case where the tooth contains a vital pulp which needs more protection than the cement affords, it is advisable to put a wafer of gutta-percha in the floor of the cavity, after having previously coated the under surface of the wafer with a good cavity varnish. By this method he had successfully filled over newly exposed pulps, in which cases he always makes a concavity in the under surface of the wafer with a ball burnisher, and wait for the cement to set very hard before adding the second piece of gold, always exercising great care in packing the gold over the exposed portion. If the pulp is in a healthy condition, and if it has not been infected during the operation—performed without pain through pressure—there is every reason to expect a satisfactory result. In the few cases upon which he has operated in this manner, no discomfort has been reported.

In all simple cavities the adhesiveness of the cement is alone amply sufficient to retain the filling, but in a compound cavity including a portion of the incisal or occlusal surface, he advises the securing all possible anchorage in addition to that afforded by the cement, being careful not to allow the latter to fill the undercuts or dovetailed spaces.

In the case under consideration he would not allow the cement to flow into the sulcus, but if this tooth contained a vital pulp in need of every possible protection he would then have applied just enough cement to cover the floor of the sulcus. In all cases, except in very deep simple cavities, use just enough cement to thoroughly line the cavity with a thin film. Apply the cement with a flat amalgam instrument of suitable size and shape, and press the first layer of gold to position with the same or a similar instrument. While the first layer of gold is being pressed firmly to position, all excess cement will be forced out at the margins of the cavity, and a little practice will enable one to do it in such a way that but little surplus of cement will be squeezed out.

Allow the cement on the slab to set before proceeding with the filling. It is invariably necessary to insert the first layer of gold while the cement is still in a thoroughly plastic state, for if it should become slightly stiff it will surely crumble under the pressure incident to the packing of the gold. In large cavities so situated that they are not directly accessible, it is preferable to apply the cement and a layer of gold to one portion of the cavity, and then after preparing a fresh mix of cement, to apply it to the remainder of the cavity. If the proper instruments, however, are used this is seldom necessary.

Only recently one of our venerable gold-workers pointed out the fact that it is very easy for the best of us to insert a very pretty gold filling just a trifle smaller than the cavity.

This he thought especially true of the class of small cavities which have to be reached from the lingual aspect. In fact he felt these cavities had annoyed him more than any others, but by using cement, the filling is easily started and completed with one hand, the left hand being used to hold the mirror. These cavities require no retaining grooves or points. He prefers cement to any form of cavity varnish or lining, because when the cement has set it is easily removed from the margins, as it is not sticky and is easily discovered by its color.

The strip form of Watts' crystal gold is, he believes, the most convenient form for this work, and if proper attention is given to its condensation, the completed filling will have a smooth and more durable surface.

This method is especially adapted to frail teeth, because the cement supports the weak enamel walls and gives them a good color. In cases where the labial wall of an anterior tooth is quite firm but transparent, the results are especially satisfactory. Another feature in favor of this method is that it does away with the necessity for wedging the gold between the walls; instead, it may be condensed directly against the floor of the cavity. This is of special advantage in the treatment of delicate and brittle teeth.

Clinic of the G. V. Black Dental Club of St. Paul, Minn.*

First Day.

Dr. A. G. Fee, Superior, Wis. (Reported by Dr. Alfred Owre, Minneapolis, Minn.). "Gold Filling." Mesial cavity, involving the incisal angle of an upper right central incisor, making a step preparation necessary.

Separation had been partially obtained with gutta-percha for a period of five days previous to the operation. There was a slight overlapping of the incisal angle and an end-to-end bite. The Black system of cavity preparation and filling was used. No. 4 Ney's cohesive foil in one-sixteenth and one-thirty-second sized

* The operations made by the members of the G. V. Black Dental Club of St. Paul were reported by the members of the Livingston County Dental Society of New York.

pellets was used. Small plugger points were generally used, with hand pressure, the mallet wielded by an assistant—a lead-filled leather-face mallet being the instrument used. The time of the operation was two hours and fifteen minutes, as follows: Adjusting dam and preparation of cavity, thirty minutes; insertion of gold, sixty minutes; finishing, forty-five minutes.

The filling was built to an ideal normal contact with opposing tooth (originally overlapped), thus establishing a normal interproximal space with a view to a growth of healthy gum tissue to fill it.

Dr. G. N. Beemer, Mason City, Ia. (Reported by Drs. Griswold, Parrish, and Cowan.) "Gold Filling." Cavity in the disto-occlusal surface of an upper right first bicuspid.

In preparing the cavity the Black and the Wedelstaedt selection of cutting instruments were used. The filling was started in the approximal surface with non-cohesive gold. Three cylinders in all were used, one containing one-half sheet of No. 4 gold, the other two one-quarter of a sheet each of the same gold. The filling was then completed with pellets of cohesive gold, which contained one-sixteenth and one-thirty-second of a sheet of No. 4 gold. One plugger was used throughout the operation. When the gold was all in the cavity, condensing pluggers were used. The finished filling presented a pronounced contour. When, however, the cavity in the mesio-occlusal surface of the adjoining bicuspid was filled by Dr. Clack, a perfect contact was established, a thing so rightly sought by the members of the Black Club. In the opinion of the committee two corrections were necessary. It might have been well for the operator, on completing his cavity preparation, to have sterilized or dehydrated the cavity; and the burnisher should have been used on the completed filling.

Dr. W. R. Clack, Clear Lake, Ia. (Reported by Dr. Wilson.) "Gold Filling." Cavity in the mesio-occlusal surface of an upper right second bicuspid (same patient for whom Dr. Beemer operated).

So far as cavity preparation, placing the gold, etc., were concerned, the operation made by Dr. Clack was very much like that made by Dr. Beemer. Both fillings were made to withstand the heaviest stress of mastication. The small points of contact would give no lodgment to anything, while the form of the lingual and buccal embrasures was of such a nature as to deflect food away from, rather than into the interproximal space and against the gum septum. These fillings were examples of scientific dentistry.

Dr. K. E. Carlson, St. Paul, Minn. (Reported by Dr. J. J. Scott.) "Gold Filling." Cavity in the mesial surface of an upper right lateral incisor, involving the incisal edge.

Preparation: Chisels were used to remove all frail and overhanging enamel not supported by sound dentin. The decayed dentin was all removed. The incisal surface of the tooth was then ground. Retention was obtained by making slight grooves with a small inverted cone in the gingivo-axial angles and in the dentin in the incisal surface.

Cohesive gold was used throughout

the operation. One plugger was used with which to pack the gold. Hand malleting was also used from start to finish. The completed operation was a beautiful, almost perfect filling, with good margins and contour.

To my mind, in this case a porcelain filling properly made would have been far more artistic and probably as lasting.

Dr. A. C. FAWCETT, Rochester, Minn. (Reported by Dr. Povall.)

Dr. Fawcett was unable to obtain a patient, so he spent his time in giving a table clinic. He displayed a large number of plaster-of-Paris casts, which illustrated abnormal conditions in so far as these related to failure of dental operations. In other casts he illustrated the restoration to normal conditions that his operations had brought about. His clinic was most instructive and interesting.

Dr. J. H. CONZETT, Dubuque, Iowa. (Reported by Dr. Bradley.) "Gold Filling." Cavity in the mesio-occlusal surface of an upper left first molar.

The preparation and method of filling this cavity were in all particulars so very similar to those prepared and filled by Drs. Clack and Beemer that it would be mere repetition to describe it in detail.

The same can be said of the clinics by Dr. F. S. JAMES and Dr. J. W. S. GALLAGHER of Winona, Minn. (reported by Drs. Allen and C. J. Fraley), who made very large operations with gold in bicuspids and molars.

It would have been impossible for one to believe, unless he had seen it, that so many operators could have been obtained who used the same methods, instruments, etc. All the completed operations had the appearance of having been made by the same operator.

Dr. G. D. MOYER, Montevideo, Minn. (Reported by Dr. Moore.) "Gold Filling." Cavity in the mesial surface of an upper right lateral incisor, involving the incisal angle.

The cavity was prepared and filled in the same manner as was the case operated upon by Dr. Carlson, with one exception. As the lateral incisor showed much incisal wear, Dr. Moyer removed sufficient tooth-substance on the incisal surface to make room for a very large mass of gold. The gold for this part of the tooth was very thoroughly condensed. The completed operation showed a beautiful operation which for years to come should do good service.

Dr. A. C. SEARL, Owatonna, Minn. (Reported by Dr. J. W. Cowan.) "Gold Filling." Cavity in the mesio-occlusal surface of an upper right first bicuspid.

The same method and details were displayed as in the operation made by Dr. Beemer. (See page 326.)

After finishing the filling on the occlusal surface, a separator was adjusted, and the teeth were moved apart. The point of contact was then polished. On removing the separator the teeth resumed their natural positions.

Second Day.

Dr. A. C. SEARL, Owatonna, Minn. (Reported by Dr. Scott.) "Gold Filling." Cavity in the mesio-occlusal surface of an upper right second bicuspid.

The walls of the cavity were well extended lingually and buccally. The gingival seat was made flat. The walls were made parallel and the cavity was extended well across the occlusal surface. No matrix was used. Non-cohesive gold, in the form of cylinders, was used for filling the gingival third of the cavity, and the operation was completed with cohesive gold.

The filling was then finished. The entire operation took but one hour and twenty minutes. A fine filling with good contour was the result. Had a matrix held in position by a good separator been used, as good a contour could have been made. Certainly the finishing would have been much easier for patient and operator.

Dr. G. D. MOYER, Montevideo, Minn. (Reported by Dr. Povall.) "Amalgam Filling, demonstrating the Method of Using the Black Matrix in connection with the Wedelstaedt Tie."

The cavity preparation was along the lines laid down by Dr. G. V. Black, and as a demonstration of his method from a practical and scientific standpoint was a complete success. The seating of the filling and the step anchorage in the occlusal surface are, to my mind, marked advances in the art of filling teeth. The reporter feels satisfied that a cavity prepared and filled as Dr. Moyer prepared and filled this cavity, presupposing that the filling be mechanically perfect, would preserve the tooth for all time so far as human agencies can interpose.

The Black matrix with the Wedelstaedt tie is a most efficient accessory. The matrix is adapted to each particular cavity, and it enables an operator to make a proper contact, so essential to a perfect filling. Before adjusting the rubber dam, the dam was marked with a blue pencil. The holes were then burned through the dam—an improvement on the dam punch, for each hole was reinforced with a rim of melted rubber.

Dr. F. S. JAMES, Winona, Minn. (Reported by Dr. Kuhn.) "Gold Filling." Cavity in the mesio-incisal surface of an upper right canine.

At the first day's clinic Dr. James made a gold filling for this patient in the mesio-occlusal surface of an upper right second bicuspid, the tooth having previously been filled with amalgam. The disto-occlusal surface of the adjoining first bicuspid was also filled with an amalgam filling. It was the intention of the operator to remove the amalgam from the first bicuspid and make a gold filling, so as to demonstrate to the greatest extent possible the methods followed by the members of the Black Club; but on removing the amalgam a large mass of decay was found in the cavity. When the decay was partially removed it was at once observed that any more operating on the tooth would expose the pulp, so Dr. James prepared and filled a cavity in the canine. All-cohesive gold was used to make the filling. The cavity was prepared with right-angle anchorage. When the filling was condensed, a saw, about the size of a horsehair, was placed in a Black saw-frame, and the surplus gold along the gingival margin was removed. Three cuts were made with the

saw. The Black No. 8 knife was principally used to trim the filling to form.

Dr. J. W. GALLAGHER, Winona, Minn. (Reported by Dr. C. J. Fraley.) "Amalgam Filling." Cavity involving both mesial and distal surfaces of a lower right second bicuspid.

The operator announced that he had been requested to make a special operation in the disto-occlusal surface of a lower bicuspid, as all the other gold operations which had been made by the members of the Black Club had been made in teeth in the maxilla.

After adjusting the rubber dam and dehydrating the teeth, he removed an amalgam filling which was in the disto-occlusal surface of the second bicuspid. The previous operator had not removed the decay prior to placing the amalgam in the cavity. On removing the decay Dr. Gallagher found the pulp involved. Cocain anesthesia was used, the pulp was removed, and the root-canal was filled with gutta-percha. In preparing the cavity in the distal surface a cavity of decay was also found to exist in the mesial surface. The operator prepared both cavities, cutting a step entirely across the occlusal surface of the tooth and bringing the occlusal margin of the cavity up to the lingual and buccal marginal ridges. He then placed a thin strip of copper completely around the tooth, and with a Wedelstaedt tie secured it to place. The cavity was then filled with quick-setting amalgam. When the amalgam had become hard, the thread which held the matrix was cut and the matrix removed. The filling was then trimmed to form and polished.

Unless it could be seen, few people would believe that such small points of contact could be made on an amalgam filling. To all appearances the completed operation seemed as good as any of the operations which had been made with gold, the only difference being in the color of the material used.

Dr. A. C. FAWCETT, Rochester, Minn. (Reported by Dr. Allen Fraley.) "Gold Filling." Cavity in mesio-occlusal surface of an upper left first molar.

The cavity was prepared in the most careful manner possible. The margins were extended until sound unaffected dentin was reached. The gingival seat was made flat. A step anchorage was made in the occlusal surface. The method of filling was the same as used by Drs. Searl, Beemer, etc. The completed operation showed the handiwork of a master workman, every surface being smooth and highly polished, the contact point perfection itself, and the occlusion correct.

Dr. J. V. CONZETT, Dubuque, Ia. (Reported by Dr. Povall.) "Gold Filling." Cavity in distal surface of an upper left canine, involving the incisal angle.

The cavity was prepared with a right-angle anchorage. Cohesive gold was used from start to finish.

Dr. K. E. CARLSON, St. Paul, Minn. (Reported by Dr. Bradley.) "Gold Filling." Cavity in distal surface of an upper right central incisor, involving the incisal angle.

The cavity preparation did not differ from that which the same operator made in his operation of the previous day. The gingival seat was flat. The step in the incisal surface was ample for retentive purposes. Cohesive gold was used. The filling when completed was a most artistic piece of operative work.

Dr. W. R. Clack, Clear Lake, Ia. (Reported by Dr. Scott.) "Gold Filling." Cavity in disto-occlusal surface of an upper right second bicuspid.

This operation was made along the same lines as those already described.

Dr. G. N. Beemer, Mason City, Ia. (Reported by Dr. Wilson.) "Gold Filling." Cavity in mesio-incisal surface of an upper right central incisor.

This operation was almost the same as the one made by Dr. Carlson, and a description seems unnecessary. In all particulars it was as perfect as could be made.

Dr. P. H. Jones, Clear Lake, Ia. "Gold Filling." Cavity in distal surface of an upper right canine.

On reaching the chair when Dr. Jones was operating, your reporter found that the operator had shortened the tooth for the purpose of making a right-angle anchorage in the incisal surface. How far the decay had involved the disto-occlusal angle is not known, because of that angle having been cut away prior to the reporter's seeing the case.

The completed operation was a beautiful large gold filling, of great density and good form, and it should preserve the tooth for all time to come.

Dr. H. J. Beemer, Newton, N. J. "Gold Filling." Cavity in mesio-occlusal surface of an upper right second bicuspid.

In all the other operations made by those working under the Black standard, the hand mallet wielded by an assistant was used. But in this operation a small 5 mm. almost straight plugger point was used in an automatic mallet.

The completed filling did not differ from those made by the other operators. In form, contour, point of contact, and in other essentials, it is most excellent.

APPENDIX.

Constitution of the National Dental Association.

PREAMBLE.

WE, the members of the American Dental Association and of the Southern Dental Association, do declare ourselves a Society to cultivate the Science of Dentistry, and have adopted the following Constitution and Rules of Order for our government:

CONSTITUTION.

(Adopted at Old Point Comfort, August 5, 1897. Revised and amended at Asheville, N. C., August 1903.)

ARTICLE I.

NAME.

This organization shall be known by the name of the NATIONAL DENTAL ASSOCIATION.

ARTICLE II.

OBJECT.

The object of this Association shall be to cultivate the science and art of dentistry and all its collateral branches, to elevate and sustain the professional character of dentists, to promote among them a mutual improvement, social intercourse and good feeling, and collectively to represent and have cognizance of the common interests of the dental profession.

ARTICLE III.

MEMBERS TO BE OF THREE CLASSES.

SECTION 1. The members of this Association shall be of three classes, viz, permanent, delegate, and honorary members; the two former classes having equal rights and privileges, except that none but permanent members shall be eligible to office.

PERMANENT MEMBERS.

SEC. 2. Permanent members shall consist of those who, coming as delegates and complying with the requirements of the Association, shall sign a statement in a book to be kept for that purpose, signifying to the Treasurer a desire for permanent membership.

DELEGATE MEMBERS.

SEC. 3. All members shall be practitioners of dentistry. They shall be received only from permanently organized state dental societies. They shall be elected by ballot at some regular meeting of their society, and shall be members who have done some meritorious work for the profession; but no person shall be received as a delegate who is in arrears for dues to this Association.

SEC. 4. Honorary members shall consist of prominent, worthy members of the dental profession residing in foreign countries, who shall be elected by ballot.

SEC. 5. It is hereby specially provided that all persons at present permanent members of the American Dental Association and of the Southern Dental Association are permanent members of this Association, and entitled to all the privileges of the class to which they belong, without further action, and the Treasurer is hereby directed to transcribe their names upon the roll of membership of this Association.

ARTICLE IV.

DELEGATES FROM STATE SOCIETIES.

SECTION 1. Any permanently organized state dental society may send one for every six of its active members as delegates to this Association for one year, upon complying with the requirements of its Constitution;

but no society shall be entitled to representation that does not accept or substantially recognize the Code of Ethics of this Association.

SEC. 2. Each delegate shall present credentials which shall be approved by the Executive Committee.

SEC. 3. If the Committee on Credentials has knowledge that any applicants for membership are violating the Code of Ethics, said applicants shall not be received, but shall be referred by the committee to the societies whose delegates they are, and in no case shall this Association be compelled to treat with violations of the Code except the violator is a member of this body and has no membership in any local body.

SEC. 4. This Association will receive no delegates who, since August 1875, shall have entered the profession without having first graduated at some reputable dental or medical college.

ARTICLE V.

SIGNING CONSTITUTION.

SECTION 1. Each new member, before voting or speaking on any subject before the meeting, shall sign this Constitution, inscribing his name and the title of the society from which he receives his appointment. It is expressly agreed by each member in signing this Constitution that he will accept the discipline of a two-thirds vote of this Association.

DUES.

SEC. 2. The annual dues in this Association shall be five dollars.

DUES—TO BE PAID.

SEC. 3. No member is eligible to office, nor can he speak or vote in this Association, in any of its sections, or in any of its branches, until his annual dues are paid.

DUES—IF UNPAID.

SEC. 4. If the dues of any member remain unpaid for two years his name shall be erased from the list of members of this Association.

CONDUCT OF MEMBERS.

SEC. 5. Any act of special immorality or unprofessional conduct committed by a member of this Association shall be referred to the Executive Committee, whose duty it shall be to thoroughly examine into the case, and if the charges be sustained, to report to the Executive Council during the annual session at which the charges are preferred. Whereupon, by a vote of the council the offending member may be reprimanded or expelled, a two-thirds vote being required for expulsion, a majority being sufficient for reprimand.

EXPELLED MEMBERS.

SEC. 6. Any member of this Association being expelled or suspended from his local society, shall from that date cease to be a member of this body.

RESIGNATION OF MEMBERS.

SEC. 7. Any member not in arrears may offer his resignation, upon the acceptance of which by the Council, his membership shall cease; but the Council may at any time thereafter reinstate such member by unanimous consent. In case a member is dropped for non-payment of dues, two years' dues must be paid before reinstatement; nor shall he represent his society as a delegate until the two years' back dues are paid.

ARTICLE VI.

OFFICERS.

SECTION 1. The officers of this Association shall be a President, three Vice-presidents, Corresponding Secretary, Recording Secretary, Treasurer, an Executive Committee consisting of nine members, an Executive Council, consisting of the President, Secretary, and five members, three Chairmen and three Secretaries of Sections, to be elected as hereinafter provided.

SEC. 2. Each officer, except as otherwise provided, shall hold his appointment for one year, or until another is elected and qualified to succeed him.

SEC. 3. The President shall be chosen from the division in which the next annual session is to be held, and one of the Vice-presidents shall be chosen from each division. (See Article XII.)

SEC. 4. At the first election three members of the Executive Committee shall be elected from each division of the country, who shall hold office for one, two, and three years, respectively; afterward but one member shall

be elected each year from each division, and hold office for three years.

SEC. 5. One member of the Council shall be elected each year from the division in which the newly elected President resides, and two members from each of the others.

SEC. 6. At the first election after this amendment goes into effect, one Chairman and one senior and one junior Past Chairman for each section shall be elected. Thereafter one Chairman and one Secretary of Sections shall be elected each year from each division, and each Chairman of Sections shall be known as Junior Past Chairman for the first year and as Senior Past Chairman for the second year after the expiration of his time as Chairman.

SEC. 7. The names of places for holding the next annual session and the candidates for office shall be nominated by informal ballot of the Association. The three names that are highest, or in case of tie, four names having the greatest number of votes shall be the sole nominees. A formal ballot shall then be taken in which a majority of the ballots cast shall be necessary to a choice. If a choice be not made on the second formal ballot the name of the candidate receiving the fewest votes shall be dropped on the third formal ballot. The informal ballot may be made a formal ballot by a three-fourths vote of the Association. Provided that for the re-election of Recording Secretary, Corresponding Secretary, Treasurer and Secretaries of Sections a motion, seconded, that the Recording Secretary, or Treasurer, shall cast the ballot, shall be entertained, but if this fails to carry, nominations shall be made as herein before specified.

ARTICLE VII—DUTIES OF OFFICERS.

DUTIES OF PRESIDENT.

SECTION 1. The President shall preside according to parliamentary usage as laid down in "Robert's Rules of Order" and the Rules of Order adopted by this Association, and shall present an annual address.

DUTIES OF VICE-PRESIDENT.

SEC. 2. In the absence of the President, one of the Vice-presidents shall perform the duties of the office, and in absence of these officers a Chairman *pro tem.* shall be appointed by the Executive Council.

DUTIES OF CORRESPONDING SECRETARY.

SEC. 3. The Corresponding Secretary shall attend to the correspondence of the Association with other scientific bodies, when desirable, and with the societies represented in this Association. It shall be his duty to obtain information of and report annually to the Executive Council, and with its approval to this Association, an account of the meetings held, the numbers of the membership and attendance, subjects discussed in papers, essays, or otherwise, by the societies represented in this Association, and such other matters of interest as may be well to incorporate in the proceedings of this body.

DUTIES OF RECORDING SECRETARY.

SEC. 4. The Recording Secretary shall keep accurate minutes of the proceedings of the Association, preserve the archives and unpublished documents, and attend to the other duties that pertain to his office. He shall be ex-officio Chairman of the Publication Committee, and shall see that due notice is given of the time and place of the annual sessions of the Association. He shall be secretary of the Program Committee, and see to the preparation and printing for this committee and its distribution to the members of all societies represented in this Association, and shall provide each newly elected official with a correct copy of this Constitution.

DUTIES OF TREASURER.

SEC. 5. The Treasurer shall hold all the moneys belonging to the Association, and shall keep an accurate account as between the Association and its members. He shall furnish bonds satisfactory to the Executive Committee. He shall attend the session of the Executive Committee at 9 A.M. on the first day of the annual session to receive dues, and shall attend at roll call to verify the lists of names upon payment of dues within the legal limits, and shall notify all whose names may be erased from the list of membership. He shall pay the drafts of the Secretary, countersigned by the President, and shall report to the Executive Committee, where his accounts shall be audited and by

whom his report shall be presented to the Executive Council, together with their own.

SEC. 6. All resolutions appropriating money, except for the legitimate expense of this Association, shall require a two-thirds vote of all the members of the Association present at a general session of an annual session.

ARTICLE VIII.

EXECUTIVE COMMITTEE.

SECTION 1. The Executive Committee shall be the business committee *ad interim* of the Association. They shall report to the Executive Council at each annual session, under the proper head, their doings for the current year.

SUB-DIVISION OF THE EXECUTIVE COMMITTEE.

SEC. 2. The Executive Committee shall meet after the election of new members to choose their own chairman and secretary, and to divide themselves into three sub-committees as follows, and for the purpose described:

FIRST DIVISION OF THE EXECUTIVE COMMITTEE.

SEC. 3. The first division of the Executive Committee shall include its chairman. It shall act as the Committee of Arrangements, and shall make suitable preparations for the meetings of the Association, consulting with the Program Committee as to its needs. It shall report to the Executive Council at its first meeting of the annual session and with its approval see to the carrying out of the arrangements during the annual session. It shall provide a book for the registration of members or visitors as they arrive; and it shall be their further duty to secure from the Treasurer a good and sufficient bond.

SECOND DIVISION—CREDENTIALS AND AUDITING COMMITTEE.

SEC. 4. The second division of the Executive Committee shall act as a committee on registration, and shall meet for that purpose at 8 A.M. on the first day of the annual session. They shall examine and verify the qualifications of members, including all violations of the Code of Ethics and the Constitution. They shall register the names of members or visitors as they arrive, with place of their residence and hotel address, and give them all necessary information regarding the arrangements for the meetings, the literary program and arrangements for entertainment, if any. They shall also act as the auditing committee for the year.

THIRD DIVISION—COMMITTEE ON VOLUNTEER ESSAYS.

SEC. 5. It shall be the duty of the third division to examine all essays, papers, or reports that may be referred to it by the Executive Council before presentation to the Association and to report to the Executive Council their approval or disapproval of such essays, papers, or reports in whole or in any particular parts, to the end that the time of the Association may not be occupied by the reading of irrelevant, unimportant, or improper matter.

REPORTS OF SUB-COMMITTEES.

SEC. 6. Each of these sub-committees shall report from time to time, as may be necessary, to the Executive Committee as a whole, who shall decide upon such report, if possible; but in case of their inability to decide upon any matter, it shall be brought before the Executive Council for its decision.

MEETINGS OF EXECUTIVE COMMITTEE.

SEC. 7. The Executive Committee shall, if possible, meet for consultation and arrangement of their respective duties on the day preceding the annual session of the Association. The Chairman may at his discretion summon the members thereof to a meeting for consultation or making reports, at any suitable hour during the annual session of the Association, and at any other time at the request of five members of the committee.

ARTICLE IX.

EXECUTIVE COUNCIL.

SECTION 1. The Executive Council shall be the business head of the Association during its annual session, and when it deems it necessary have charge of all its business matters whatever; and it will be its duty to take cognizance of the doings of any and all of its officers, see to the smooth working of all of its parts, and attend to all matters referred to it.

SEC. 2. The Executive Council shall meet at nine o'clock on the day of the first meeting of each annual session, to receive the reports of committees and afterward by adjournment or at the call of the presiding officers and committees, for the transaction of other business of the Association.

SEC. 3. All matters not otherwise specially provided for shall be referred to the Executive Council without debate.

SEC. 4. The Executive Council shall report to the Association at each general session the results of their proceedings for ratification or rejection without debate.

SEC. 5. The President and Secretary of this Association shall hold the same positions in the Executive Council as in the Association.

SEC. 6. Five members of the Council shall constitute a quorum for the transaction of business.

SEC. 7. All meetings of the Council shall be public; the time and place for which shall be posted for information of the members. Members may be heard on any matter before the Council.

ARTICLE X.

LOCAL COMMITTEE OF ARRANGEMENTS.

SECTION 1. There shall be appointed by the President, annually, a committee of three, residing at or near the place selected for the next meeting, whose duty it shall be to assist the Executive Committee to procure rooms for meetings, and make such other local arrangements as may be needed for the Association.

VACANCIES.

SEC. 2. In case vacancies occur in the Committees or Officers of this Association by reason of absence from the annual session or otherwise, such vacancies shall be filled by appointment *pro tem.* by the President.

PUBLICATION COMMITTEE—HOW APPOINTED.

SEC. 3. The President shall appoint two members of this Association who shall act in conjunction with the Recording Secretary as the Publication Committee. The Committee shall be authorized to employ a sufficient number of competent reporters to furnish an accurate report of the proceedings of each meeting of Sections, and of each general session.

ARTICLE XI.

INSTRUCTIONS TO THE PUBLICATION COMMITTEE.

SECTION 1. The Publication Committee shall superintend the publication and distribution of such portions of the transactions as the Executive Council may direct, or the Committee judge to be of sufficient value.

They shall specify in the annual report of this Committee the character and cost of the publications of the Association during the year, to whom they are distributed, and the number of copies still on hand.

SEC. 2. Any report or other paper, to be entitled to publication in the volume of transactions for the year in which it shall be presented to the Association, must be placed in the hands of the Publication Committee in typewritten form within twenty days after the close of the annual session; and must also be so prepared that the proof sheets furnished the authors shall be returned to the Committee without material alteration or addition.

SEC. 3. Every paper received and accepted by this Association, and all plates or other means of illustration, shall be considered the property of the Association, so far as may be necessary for the publication in the transactions of this body.

DISCLAIMER.

SEC. 4. The Publication Committee is hereby instructed to print at the beginning of each volume of the transactions the following disclaimer, viz: "The National Dental Association although formally accepting and publishing the reports of the various sections, and the essays read before the Association, holds itself wholly irresponsible for the opinions, theories, or criticisms therein contained, except when otherwise decided by special resolution."

ARTICLE XII.

SECTION 1. For the purpose of this Association, the United States shall be divided into three divisions, to be called the East, the South and the West.

The East shall include New England, New York, New Jersey, Pennsylvania, Ohio, In-

diana, lower peninsula of Michigan, and Ontario.

The South shall include Delaware, Maryland, District of Columbia, Virginia, North Carolina, South Carolina, West Virginia, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Kentucky, Tennessee, Arkansas, Oklahoma and Indian Territory.

The West shall include Illinois, Missouri, Wisconsin, upper peninsula of Michigan, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, Montana, Wyoming, Colorado, Idaho, Utah, Washington, Oregon, Nevada, California, Arizona, New Mexico, and Alaska.

PLACE OF MEETING.

SEC. 2. The place of holding the next annual session shall be determined each year by ballot of the Association at its annual session, in the general session of the third day, except that the place of meeting shall be in the West in 1898, in the East in 1899, and in the South in 1900, and thereafter in the order named, meeting in each section every third year.

ARTICLE XIII.

ORGANIZATION OF SECTIONS.

SECTION 1. This Association shall be divided into three sections, as follows:

The first section shall have charge of prosthetic dentistry, crown and bridge work, orthodontia, metallurgy, chemistry, and allied subjects.

The second section shall have charge of operative dentistry, nomenclature, literature, dental education, and allied subjects.

The third section shall have charge of oral surgery, anatomy, physiology, histology, pathology, etiology, hygiene, prophylaxis, materia medica, and allied subjects.

SEC. 2. It shall be the duty of each member to identify himself with one or more of the above-named sections, and he shall inform the Recording Secretary of his choice at the time of joining the Association.

SEC. 3. The Secretary shall assign members to the sections in which they are expected to work if they shall fail to make their own choice before the close of the general session of the second day of the annual session.

SEC. 4. It shall be the duty of the Recording Secretary to keep a list of the members of the sections and to furnish copies of the same to the officers of the sections.

SEC. 5. The Chairman of each section shall preside at all of its meetings; shall exercise general supervision over its business, and shall see that the labors of his section are so conducted as to secure the best results. In the absence of the Chairman the senior or junior past Chairman shall preside. (See Article VI, Section 6.)

SEC. 6. The Secretary of each section shall keep full and accurate records of the doings of his section, shall have charge of the stenographic reports, and report the same to the Recording Secretary each day, as soon as possible after their approval by his section.

SEC. 7. For information of all members a list of the names of members of sections shall be published in the transactions of each year.

ARTICLE XIV.

MEETINGS.

SECTION 1. The meetings of this Association shall be known as annual sessions, general sessions, and meetings of sections.

SEC. 2. The annual sessions shall begin on the first Tuesday in August of each year and continue four days.

SEC. 3. The general sessions shall be meetings of the whole membership in attendance upon the annual session and shall be held as follows:

The first general session shall convene at 10 o'clock on the first day and shall stand adjourned at 1 p. m., unless adjourned earlier. During this session the functions appropriate to the opening of the annual session may be performed, and the annual address of the President delivered.

On the second, third, and fourth days the Association shall convene in general session at 12 o'clock, noon, and stand adjourned at thirty minutes past one, unless adjourned sooner.

SEC. 4. In the general sessions any member may introduce matters of business, if seconded, which must then be referred to the Executive Council without debate, provided that any member, opposed to such matter of business or motion, with a second, may call for a vote on such reference. A vote shall then be taken without debate, and if

decided in the negative, that shall dispose of the matter for that annual sesssion.

SEC. 5. The general session shall receive reports from the Executive Council as the first order of business, after the reading of the minutes, and shall approve or annul any matter of business or motions referred to it by the Executive Council by vote without debate.

SEC. 6. The election of officers of the association shall be held at the general session of the third day of the annual session, and newly elected officers presiding over the general sessions shall be installed at the close of the general session on the fourth day, and those presiding over meetings of each section at the close of the last meeting of the section during the annual session.

SEC. 7. At the second and fourth general session there may be presented such addresses or reports as may be determined by the Program Committee, with the approval of the Executive Council, but these shall in no case occupy more than one hour of the general session.

SEC. 8. Sections 1, 2, and 3 shall each meet in separate rooms at 2.30 o'clock on the first day of the annual sesssion for the reading and discussion of such essays, papers, reports, or for clinics, as may be determined upon by the Program Committee, with the approval of the Executive Council. Thereafter similar meetings of each section shall be held at 9 a. m. and 2:30 p. m. each day of the annual sesssion. Evening meetings of the sections may be held as determined by each section.

SEC. 9. No business of any kind not strictly pertaining to the proper carrying out of the literary, scientific or clinical work of the sections shall be introduced or considered in the meetings of the sections.

ARTICLE XV.

PROGRAM COMMITTEE.

SECTION 1. The Committee on Program shall consist of the President, Secretary, the Chairmen of sections, and the two last past Chairmen of sections. It shall be the duty of this Program Committee to keep close watch over the progress of dental science and literature and to arrange with competent persons in the profession who are members of this Association, or with persons of known ability in closely allied subjects in science not members, to prepare and read or to discuss essays, papers, contributions, or perform such clinical demonstrations as will tend to the improvement of dentistry. It shall report to the Chairman of the Executive Committee what special preparations may be needed for carrying out the program that may be arranged or contemplated.

SEC. 2. The senior past Chairman, junior past Chairman and Chairman of each section shall, subject to the Committee, act as a Sub-Committee having especial charge of the program of that section, the responsibility in this work being in the order named.

SEC. 3. The President of the Association shall be President of the Program Committee, or, when present, shall preside over meetings of a Sub-Committee. The preparation of the program for the general sessions shall be under his charge. In meetings of the Program Committee, in the absence of the President, the senior past Chairman of sections present shall preside, seniority beginning with the division in which the President resides and following the order of rotation.

SEC. 4. The Recording Secretary shall act as the Secretary of the Program Committee and shall have charge of the preparation, printing, and distribution of the programs. He shall announce at each general session the arrangement of the program for the next general session; and also the program for each of the sections for the next twenty-four hours.

SEC. 5. The Program Committee shall meet for consultation regarding the next year's work as soon as possible after the election of officers, and hold such meetings thereafter on the call of the President or Secretary, as may be deemed necessary to the efficient carrying out of the work.

SEC. 6. The Program Committee shall report to the Executive Council at its first meeting on the morning of the first day of the annual session the program arranged for approval, and thereafter shall hold such meetings as may be necessary to arrange from day to day for the smooth working of the presentation and discussion of the matter of the program in the general sessions and meetings of sections.

ARTICLE XVI.

QUORUM.

Twenty members shall constitute a quorum in this Association.

ARTICLE XVII.

SUSPENSION OF RULES—THREE-FOURTHS TO VOTE.

The regular order of business may be temporarily suspended by a three-fourths vote of all the members present, for the consideration of a specific subject, upon the completion of which the regular order shall be at once resumed.

ARTICLE XVIII.

BRANCHES.

SECTION 1. For the wider diffusion of the benefits of this Association, the members of each division may form themselves into one or more separate bodies, to be styled "Branches."

POWERS AND OBLIGATIONS.

SEC. 2. Branches shall have such powers and privileges, and be subjected to such obligations, as shall be determined upon from time to time by the National Association in annual session.

SEC. 3. Each Branch shall be free to hold meetings and to govern itself as its members shall think fit, but no Branch law shall be valid which, in the opinion of the National Association may contravene any fundamental law of the Association.

SEC. 4. Each Branch shall pay its own expenses, and no Branch shall be deemed for any purpose the agent of the Association, or have power to incur any obligation in its behalf.

SEC. 5. Each Branch shall furnish a copy of its proceedings, including papers and discussions, for publication with the transactions of the National Association.

SEC. 6. Each Branch may receive delegates from societies within its division upon the same conditions as the National Association, and such delegates shall have the same standing in the National Association as though admitted directly from the state societies.

DUES.

SEC. 7. The annual dues of members attending the Branches shall be paid to the Branch Treasurer. Three-fifths of the dues may be retained for the benefit of the Branch. The remaining two-fifths shall be paid over to the Treasurer of the National Association.

SEC. 8. The annual session of any Branch shall be omitted whenever the annual session of the National Association shall be held in its division.

ORDER OF BUSINESS.

FIRST DAY.

8 A. M.—Meeting of the Executive Committee.
8 A. M.—Meeting of the Program Committee.
9 A. M.—Meeting of the Executive Council.
10 A. M.—Meeting of general session.
Report of Executive Council.
Report on Program for next general session and for each section for next 24 hours.
President's Address.
1 P. M.—Adjournment of general session, unless sooner adjourned.
2:30 P. M.—Meetings of sections for literary and scientific work.
8 P. M.—Meetings of sections for literary and scientific work.

SECOND DAY.

9 A. M.—Meetings of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Report on Program.
Address, or Reports.
2:30 P. M.—Meetings of sections for literary and scientific work.
8 P. M.—Meetings of sections for literary and scientific work.

THIRD DAY.

9 A. M.—Meetings of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Report on Program.
Selection of next place of meeting.
Election of Officers.
1:30 P. M.—Adjournment, if not adjourned earlier.
2:30 P.M.—Meeting of sections for literary and scientific work.
8 P.M.—Meeting of sections for literary and scientific work.

FOURTH DAY.

9 A. M.—Meeting of sections for literary and scientific work.
12 NOON—Meeting in general session.
Reading of Minutes.
Report of Executive Council.
Address, or Reports.
Installation of Officers.
Appointment of Committees.
Final Reading of Minutes.
Adjournment of the Annual Session.

AMENDMENTS.

The Constitution, Rules of Order and Order of Business of this Association may be altered or amended at any annual session by unanimous consent of the members present, providing notice has been given in writing at a previous meeting of the annual session at which the amendment is proposed; or by a vote of two-thirds of the members present, providing notice of the alteration or amendment has been given in writing at a previous annual session.

STANDING RESOLUTIONS.

The following standing resolutions are in force at this time:

1. RESOLVED, That a paper presented to the Committee on Voluntary Essays, and by them considered and returned to the writer with notification that the said paper is not accepted, cannot afterward be read before the Association unless it is made the special order by resolution adopted.

2. RESOLVED, That this Association discountenances the giving of banquets, excursions, entertainments, etc., by local professional societies or individuals, either during or at the close of our annual meetings.

3. RESOLVED, That it is unprofessional to use on cards or signs anything except name, title, and address.

4. RESOLVED, That this Association now in session direct that sections belonging thereto shall in the future be prohibited from inviting individuals who are violating the Code of Ethics to hold clinics or to give other exhibitions before this body.

5. RESOLVED, That a standing committee of three be appointed to be known as the Committee on Terminology, whose duty it shall be to prepare and submit a carefully prepared report at each annual meeting of this Association.

6. RESOLVED, That this Association believes the conferring of honorary degrees in dentistry to be detrimental to the profession of dentistry, and hereby expresses its disapprobation of the practice.

7. RESOLVED, That a committee of three be appointed by the chair to co-operate with the officers in charge of the Army Medical Museum and Library in enriching its store of dental literature and specimens, especially by appealing to dental societies and individual members of the dental profession for assistance.

8. RESOLVED, That the National Dental Association condemns the use of secret preparations known as *"local anesthetics,"* as well as all other secret preparations.

9. RESOLVED, That the secretary or other officer of each society sending delegates to this Association is expected to make a general report of the work done by the society he represents during the year, giving the subjects of the paper read before them and digests of the same, and to send said reports to the Secretary of this Association at least three weeks before the date of each annual meeting; the reports to be forwarded to the chairman of the section to which they belong.

10. RESOLVED, That any member of the dental profession who has been in reputable practice for a period of fifty years may be elected to permanent membership in the Association without payment of dues, and any member of this Association who has been in practice for a like period shall have his dues remitted thereafter by presenting the fact to the Treasurer of the Association.

11. RESOLVED, That lists of the ex-presidents of the American Dental Association and of the Southern Dental Association shall be published annually in the Transactions of the National Dental Association, and that all members and officers hold the same relations to the National Dental Association that they did to the former associations.

RULES OF ORDER.

1. On the arrival of the hour of meeting the President shall take the chair, call to order, and announce that the meeting is open for business.

2. No motion or speech shall be in order until the mover or speaker shall have been recognized and assigned the floor by the chair, nor shall a motion be open for debate until seconded and stated by the chair.

3. No one shall be permitted to address the Association before giving his name and residence, which shall be distinctly announced from the chair; nor shall he speak more than twice, nor longer than fifteen minutes in all, unless by consent of the Association.

4. At the request of any member a motion shall be put in writing.

5. At the request of five members a question shall be divided or the yeas and nays ordered.

6. When a question is under debate no other motion shall be in order, except—1st, to adjourn; 2d, to lay on the table; 3d, the previous question; 4th, to postpone; 5th, to commit; 6th, to amend—and these motions shall take precedence in the order here stated.

7. The previous question and the motions to adjourn, to lay on the table, and to postpone, shall be decided without debate.

8. A motion to adjourn shall always be in order, but no member can make such a motion while another is speaking or while a vote or ballot is being taken.

9. A second amendment to the main question shall not be in order until the first is disposed of, nor shall there be an amendment of an amendment to an amendment.

10. After a motion has been seconded and stated by the chair, it shall not be withdrawn without the consent of the Association.

11. No member shall interrupt another while speaking, except to raise a point of order.

12. When called to order, a member shall sit down until the point of order is decided by the chair, or, in case of appeal, by the Association. If the point of order be sustained, the member can proceed in order by the consent of the Association.

13. Every member shall vote upon a question unless excused by the Association.

14. When any motion, except to adjourn, has been rejected, it shall not be renewed without unanimous consent.

15. Any member who on a question voted in the majority may move a reconsideration of that question; but if that motion shall be lost or laid upon the table, it shall not be renewed without unanimous consent.

16. The President may vote with the members upon all questions, but having so voted, shall not give the casting vote in case of a tie.

17. Motions for filling blanks shall be put in the order in which they are moved.

18. On a division, or in voting by yeas and nays, any member may change his vote before the result is declared.

19. These rules may be suspended by unanimous consent.

Code of Ethics.

ARTICLE I.

THE DUTIES OF THE PROFESSION TO THEIR PATIENTS.

SECTION 1. The dentist should be ever ready to respond to the wants of his patrons, and should fully recognize the obligations involved in the discharge of his duties toward them. As they are in most cases unable to correctly estimate the character of his operations, his own sense of right must guarantee faithfulness in their performance. His manner should be firm, yet kind and sympathizing, so as to gain the respect and confidence of his patients, and even the simplest case committed to his care should receive that attention which is due to operations performed on living, sensitive tissue.

SEC. 2. It is not to be expected that the patient will possess a very extended or a very accurate knowledge of professional matters. The dentist should make due allowance for this, patiently explaining many things which may seem quite clear to himself, thus endeavoring to educate the public mind so that it will properly appreciate the beneficent efforts of our profession. He should encourage no false hopes by promising success when, in the nature of the case, there is uncertainty.

SEC. 3. The dentist should be temperate in all things, keeping both mind and body in the best possible health, that his patients may have the benefit of that clearness of judgment and skill which is their right.

ARTICLE II.

MAINTAINING PROFESSIONAL CHARACTER.

SECTION 1. A member of the dental profession is bound to maintain its honor, and to labor earnestly to extend its sphere of usefulness. He should avoid everything in language and conduct calculated to dishonor his profession, and should ever manifest a due respect for his brethren. The young should show special respect to their seniors; the aged, special encouragement to their juniors.

SEC. 2. It is unprofessional to resort to public advertisements, cards, handbills, posters, or signs, calling attention to peculiar styles of work, lowness of prices, special modes of operating; or to claim superiority over neighboring practitioners; to publish reports of cases or certificates in the public prints, to circulate or recommend nostrums; or to perform any other similar acts. But nothing in this section shall be so construed as to imply that it is unprofessional for dentists to announce in the public prints, or by cards, simply their names, occupation, and place of business, or in the same manner to announce their removal, absence from, or return to business, or to issue to their patients appointment cards having a fee bill for professional services thereon.

SEC. 3. When consulted by the patient of another practitioner the dentist should guard against inquiries or hints disparaging to the family dentist or calculated to weaken the patient's confidence in him; and if the interests of the patient will not be endangered thereby, the case should be temporarily treated, and referred back to the family dentist.

SEC. 4. When general rules shall have been adopted by members of the profession practicing in the same localities in relation to fees, it is unprofessional and dishonorable to depart from those rules, except when variation of circumstances requires it. And it is ever to be regarded as unprofessional to warrant operations as an inducement to patronage.

ARTICLE III.

CONSULTATIONS.

Consultations should be promoted in difficult or protracted cases, as they give rise to

confidence, energy, and broader views in practice. In consultations that courtesy and just dealing which is the right of all should be especially observed.

ARTICLE IV.

THE RELATIVE DUTIES OF DENTISTS AND PHYSICIANS.

Dental surgery is a specialty in medical science. Physicians and dentists should both bear this in mind. The dentist is professionally limited to diseases of the dental organs and adjacent parts. With these he should be more familiar than the general practitioner is expected to be; and while he recognizes the broader knowledge of the physician in regard to diseases of the general system, the latter is under equal obligations to respect his higher attainments in his specialty.

ARTICLE V.

THE MUTUAL DUTIES OF THE PROFESSION AND THE PUBLIC.

Dentists are frequent witnesses, and, at the same time, the best judges of the impositions perpetrated by quacks, and it is their duty to enlighten and warn the public in regard to them. For this and many other benefits conferred by the competent and honorable dentists, the profession is entitled to the confidence and respect of the public, who should always discriminate in favor of the true man of science and integrity against the empiric and impostor. The public has no right to tax the time and talents of the profession in examinations, prescriptions, or in any way without proper remuneration.

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